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# COMMERCIAL FISHERIES ABSTRACTS

U.S. DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF COMMERCIAL FISHERIES





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## FISH AND WILDLIFE SERVICE

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MERCIAL FISHERIES ABSTRACTS about once a year.

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0.321 (*)	FLUORESCENCE SPECTROSCOPY OF PROTEINS  Stryer, Lubert (Stanford University School of Medicine, Palo Alto, California) Science 162, No. 3853, 526-533 (November 1, 1968)	Protein chemists are trying to answer three basic questions about the relation between the structure and the function of proteins: (1) How do they fold? (2) How do they recognize other molecules? (3) How do they carry out such functions as catalysis, transport, and motility? Although X-ray crystallography has revealed the structure of five proteins, thereby contributing to a deeper understanding of how they function, the method is not sufficient, for the view it affords is essentially static; moreover it is inapplicable to materials that cannot be crystallized. Several different physical and chemical techniques must be used in searching for answers, and the results they give must be correlated.	The author of this report discusses ways in which he used fluorescent probes to establish the degree of polarity of a particular region of a protein (polar sites can be determined from the emission characteristics of the probes), measure distances between groups in a protein (distances can be deduced from the efficiency of energy transfer between chromophores, expressed in terms of sensitized fluorescences or sensitized phosphorescence), determine the extent of flexibility of a protein (rotational motions of proteins and the degree of flexibility of their active sites can be determined by measuring fluorescence polarization as a	•item on back of card. (over)	COMMERCIAL FISHERIES ABSTRACTS VOL. 22, NO. 3, PAGE 1 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE  ABSTRACTER: L. Baldwin
0.36 (*)	SUBCELLULAR DISTRIBUTION OF O-SERYL-N-ACETYL GALACTOSAMINIDE GLYCOSIDASE IN RAT LIVER AND KIDNEY  Mahadevan, S., and A. L. Tappel (Department of Food Science and Technology, University of California, Davis) Archives of Biochemistry and Biophysics 128, No. 1, 129-132 (October 1968)	Three known types of linkages occur between amino acids and carbohydrates in glycoproteins and mucopolysaccharide-protein complexes: (1) the amide link between the $\beta$ -carboxyl group of aspartic acid and the amino group or carbon atom of 2-acetamido-2-deoxy-D-glucosylamine, (2) the glycosidic link between the anomeric carbon atom of 2-acetamido-2-deoxy-D-galactose and the hydroxyl group of serine or threonine, and (3) the glycosidic link between xylose and serine. Other workers demonstrated the occurrence of an enzyme, O-seryl-N-acetylgalactosaminide glycosidase, in extracts of beef spleen and in digestive juices of <i>Helix pomatia</i> that hydrolyzes type two linkages in ovine submaxillary gland glycoproteins (OSM). They showed that the enzyme was different from $\beta$ -N-acetylglucosaminidase but did not report the subcellular location of the new enzyme. The present researchers report on the subcellular distribution of the enzyme in rat liver and kidney.	Prepared OSM was used as a substrate for O-seryl-N-acetylgalactosaminide. The enzyme was found to be localized in the lysosomes of rat liver and rat kidney. The localization of the enzyme was the same as for acid phosphatase, the best marker enzyme for lysosomes. A 40-fold purification of the glycosidase was	•item on back of card. (over)	COMMERCIAL FISHERIES ABSTRACTS VOL. 22, NO. 3, PAGE 1 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE  ABSTRACTER: F. T. Piskur
0.38 (*)	DISSOLUTION OF FISH MUSCLE HOMOGENATES BY LYSOLECITHIN  Jonas, R. E. E. (Fisheries Research Board of Canada Vancouver Laboratory, Vancouver, British Columbia) Journal of the Fisheries Research Board of Canada 25, No. 10, 2157-2164 (October 1968)	Phospholipase A activity with the formation of lysolecithin (LL) (an intensely hemolytical substance) occurs widely in animal tissues. LL is found in highest concentration in certain organelles such as the chromaffin granules of the adrenal medulla, mitochondria, microsomes, and lysosomes. The presence of LL in such tissues and organelles suggest that it might have cytotoxic effects in fish muscle. It is possible, then, that LL formed in fish muscle could produce changes, such as those affecting quality, not attributed to it hitherto. This report presents results of studies on the effect of LL on skeletal muscle homogenates from rainbow trout ( <i>Salmo gairdneri</i> ).	Skeletal muscle from the dorsal area of the fish, free from skin and bones, was used. The incubation mixture consisted of 100 mg. muscle homogenate and 12 mg. of LL with or without the test reagent in a total volume of 3.0 ml. of 0.9 percent NaCl; control blanks with muscle homogenate only, muscle and test reagent, and muscle and LL were carried out for each test where a test reagent other than LL alone was used. Incubation was at 35° C. for 1 hr. After incubation, the homogenate mixtures were centrifuged.	•item on back of card. (over)	COMMERCIAL FISHERIES ABSTRACTS VOL. 22, NO. 3, PAGE 1 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE  ABSTRACTER: F. T. Piskur
0.35	IMMUNOCHEMISTRY OF SPERM WHALE MYOGLOBIN. III - MODIFICATION OF THE THREE TYROSINE RESIDUES AND THEIR ROLE IN THE CONFORMATION AND DIFFERENTIATION OF THEIR ROLES IN THE ANTIGENIC REACTIVITY  Atassi, M. Z. (Department of Chemistry, Wayne State University, Detroit, Michigan 48202) Biochemistry 7, No. 9, 3078-3084 (September 1968)	Specific chemical modification of amino-acid residues in metmyoglobin has been particularly useful in mapping out amino acids in reactive and nonreactive regions of the molecule. In 1967 and in 1968, the author demonstrated that the methionine residues at positions 55 and 131 and the tryptophan residues at position 7 were not essential parts of the antigenic sites of metmyoglobin. In this paper, he reports on the role of the three tyrosine residues.	Apomyoglobin was nitrated completely and specifically at the three tyrosine residues, and nitromyoglobin (nitro-Mb) was prepared from the nitrated apomyoglobin (nitro-ApoMb) and unmodified ferrhieme. The nitro-Mb exhibited electrophoretic and spectral differences but had conformational parameters identical with those of metmyoglobin X (MbX). Nitro-Apo-Mb and nitro-Mb had lower antigenic activities as compared to Apo-Mb and Mb X. Fragments 56-131 and 132-153 were obtained by cleavage of ApoMb at methionines 56 and 131 and were also nitrated; peptide 56-131 and its derivative nitrated at tyrosine 103 showed the	•item on back of card. (over)	COMMERCIAL FISHERIES ABSTRACTS VOL. 22, NO. 3, PAGE 1 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE  ABSTRACTER: F. T. Piskur

0.3 (Cross Reference: 3.6)

THE PHYSICAL STATE OF WATER IN BIOLOGICAL SYSTEMS

Ling, Gilbert N. (Department of Molecular Biology, Division of Neurology, Pennsylvania Hospital, Philadelphia)  
Food Technology 22, No. 10, 52-56 (October 1968)

The report is a brief survey of our present knowledge of the physical state of water in living cells. A better understanding of the physical state of water in biological systems is needed if we are to devise methods for improved processing of foods. The author summarizes his review by stating that recent evidence indicates that the protein and water in living cells are in close association, constituting a cooperative assembly. This association renders the hydration and dehydration of fresh foods more intricate than hydration and dehydration of simple small molecules. [32 references]

[Abstract: F. T. Piskur]

[Cross Reference: 12]  
[Cross Reference: 93.0]

0.38

HYDROLYSIS OF HIGHER FATTY ACID ESTERS  
OF P-NITROPHENOL BY RAT LIVER AND KIDNEY LYSOSOMES

Mahadevan, S., and A. L. Tappel (Department of Food Science and Technology, University of California, Davis 95616)  
Archives of Biochemistry and Biophysics 126, No. 3, 945-953 (September 1968)

Results of experiments on the subcellular distribution and properties of esterases in rat liver and kidney using higher fatty acid esters of p-nitrophenol as substrates are reported.  
[Abstract: L. Baldwin]

[Cross Reference: 13.1 figure, 13.1 tables]

The nitrogen (N) content of the supernatant solution of the homogenate containing LL was about 20 percent higher than that of the homogenate without LL. Increases close to maximum in N content of the supernatant solution occurred at a concentration of about 4 mg. of LL per milliliter of incubation medium containing 100 mg. muscle element in 3.0 ml. of 0.6 percent NaCl at pH 6.0-8.0 and about 35°C. for 1 hr. It was found that snake venom phospholipase A added to muscle homogenate showed no solubilizing activity and  $\alpha$ -tocopherol acetate and cortisol showed irregular stimulation. The author concluded that LL exerts a solubilizing action on fish muscle homogenates. Thus, he considers it possible that one of the factors influencing drip formation in cold-stored fish muscle could be related to the solubilizing action of LL. This might be especially so in commercially caught fish that have sustained body injury. The authors suggest that phospholipase A activity forming increased activity in the muscle damaged tissues.

[Cross Reference: 2.03] 83.0

0.3

THYROXINE DEGRADATION.  
ANTIOXIDANT FUNCTION AND NONENZYMATIC DEGRADATION  
DURING MICROSOmal LIPID PEROXIDATION

Wynn, James (Department of Medicine, University of Arkansas Medical Center, Little Rock)  
Archives of Biochemistry and Biophysics 126, No. 3, 880-891 (September 1968)

In 1963, Wynn and Gibbs reported that the phenoxyl radical of thyroxine may be the reactive species in the microsomal reactions that lead to the degradation of thyroxine. In the present paper, Wynn reports on investigations that demonstrate an antioxidant function of thyroxine during oxidation of microsomal lecithin. During the antioxidant reaction, he found, thyroxine is nonenzymatically degraded to yield products that are identical to those he and Gibbs found (1962, 1964) during the microsomal degradation of thyroxine. Because thyroxine participates in these reactions by a mechanism compatible with its function as a free radical chain terminator, he hypothesizes that the formation of a thyroxine radical precedes its degradation.  
[Abstract: L. Baldwin]

123.0

[Cross Reference: 8.51] 83.5

same reactivities with antisera to Mb X. Apparently, then, tyrosine 103 is not located in an antigenic reactive region in Mb. Peptide 132-153, nitrated at tyrosines 151 and 151, completely lost its inhibitory activity (inhibition of the precipitin reaction of Mb with various antisera). This loss of inhibitory activity compared well with the decrease in antigenic reactivity shown with nitro-ApoMb and nitro-Mb; also, nitro-Mb did not react with antisera to Mb 132-153. Therefore, tyrosine 146 or 151, or both, are present in a reactive region in met-myoglobin.  
[Cross Reference: 4 figures, 25 references]

[Cross Reference: 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000]

<p>2.1121 (*) Anonymous Commercial Fishing <u>7</u>, No. 8, 17, 19 (August 1968)</p> <p>Currently, the best method for midwater trawling is to use an echo sounder to locate schools of fish and then adjust the net to the desired depth by either changing the speed of the vessel or the length of the warps. This method of control is cumbersome and inadequate due to the slowness and inaccuracy of adjusting the net.</p> <p>Now a motorized trawl door has been invented that can, without any change in the speed of the vessel or the length of the warps, alter the depth of the net quickly and with a high degree of accuracy. The device looks like a section of the top and bottom wings of a biplane aircraft, the two wings being joined by a rotating metal cylinder. An electric motor inside the cylinder actuates the rotation, which forces the doors to dive or climb, depending on the direction of rotation.</p> <p>Two systems for controlling the device have been contemplated: a system whereby the rotors are controlled manually, or a fully automatic system with the echo sounder in direct control.</p> <p>(over)</p> <p>*Item on back of card.</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 3 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: S. G. Cordell</p>	<p>2.114 Brady, Peter Fishing News International <u>7</u>, No. 8, 46-48, 51 (August 1968)</p> <p>Much of the operational cost of a fishing vessel is for manual labor, and one of the main labor tasks aboard ship is the hauling of the nets. The introduction of the power block and the trawl drum greatly reduced the labor involved in net handling. The power block is a deck-mounted or suspended hauling device through which the net is fed on its way from the water to the deck. The trawl drum is a deck-mounted device that takes the trawl around its barrel.</p> <p>The power block is the more versatile, the more highly developed of the two and consequently has been used more extensively. Its main use has been in the purse seine fleets, where it has speeded up operations and allowed vessels to use much larger nets, thereby increasing their overall efficiency. Its greatest impact has been on the established fisheries of Western Europe, where the larger nets it makes possible have produced record-level catches.</p> <p>The power block has been adapted to many boats and net sizes and to various types of fishing. Now 20 or more different models are on the commercial market. In Norway, various cranes and gantries have been used with the block to keep the cost of the installation and the space it occupies to a minimum. Thus, even the smallest boat can use the hydraulic power block and purse seine for such nonpelagic species as herring and mackerel.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 3 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: L. Baldwin</p>
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<p>2.146 Richard, Joseph D. (Institute of Marine Science, University of Miami, Miami, Florida) Journal of the Fisheries Research Board of Canada <u>25</u>, No. 7, 1441-1452 (July 1968)</p> <p>Although a considerable amount of information is available about hearing and allied senses in fishes, little is known about how they respond to specific acoustic signals when they are in their natural habitat. Investigations have indicated that, although fishes hear in both the near and the far field, they are capable of localizing the sound only in the near field. The limiting distance encompassing the fish's perception of near-field sound depends on the acoustic wavelength of the signal and has been defined as between <math>\lambda/2_n</math> and <math>\lambda</math> from the source, depending on the type of source. Exaggerated displacement amplitudes in the near field of a mechanical disturbance permit localization with the lateral-line sensory system; compressional waves in the far field are detected, presumably without directional sense, with the internal auditory apparatus.</p> <p>Because these signals may play an important role in fishes' behavioral patterns, the authors studied the effectiveness of various acoustic signals in attracting various kinds of fish. Using an underwater camera, an acoustic projector, and a shore-based television monitor, they transmitted signals similar to disturbances generated by actively feeding predatory fishes. The principal variables in the signal characteristics were the frequency spectra, the modulation envelope, and the source level. Most of the signals consisted of an octave band of noise having lower and upper cutoff frequencies of 25 and 50 Hz and attenuation (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 3 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: L. Baldwin</p>	<p>2.1478 Caddy, J. F. (Fisheries Research Board of Canada Biological Station, St. Andrews, New Brunswick) Journal of the Fisheries Research Board of Canada <u>25</u>, No. 10, 2123-2141 (October 1968)</p> <p>This paper reports on underwater (SCUBA) observations of the operation of an 8-foot scallop drag on the Richibucto scallop beds (Northumberland Strait, Gulf of St. Lawrence) in August 1967. Results of other workers point out the possibility that the swimming activities of the scallop may be a potential factor in reducing the efficiency of scallop drag fishing. In the present study, particular attention was paid to the behavior of scallops in relation to the fishing gear.</p> <p>The efficiency of the 8-foot scallop drag was estimated from the population density of the scallops. Scallop density measurements were made by SCUBA divers using an enclosed quadrat (or corral) to contain the scallops. Scallops responded to an approaching object (diver or fishing gear) by facing away from them and swimming away. They usually rose steeply above bottom to a mean height of 0.4 m. then leveled off. Swimming distances of up to 4 m. were noted with estimated ground speed of over 67 cm. per second. Only a few scallops over 100 mm. could be induced to swim.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 3 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: F. T. Piskur</p>
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In addition to purse seining, the power block may be adapted to other fisheries, such as trawling and Scottish seining. Two Scottish seiners have tested the power blocks, and soon a herring trawler will be fitted with a power block to take in her large midwater trawls. Most of the latter type boats are between 50 and 80 ft. long, and many are dual-purpose seiner-trawls.

On the Scottish seiners, productivity was not greatly increased, yet the operation was an unqualified success. As one of the skippers reports, the advantages of the power block are: (a) it makes hauling and stowing the net easier, even with a reduced number of men; (b) it increases the efficiency of hauling--the ship need not be eased back to the net during hauling--and speeds up operations, allowing on average an extra haul a day; (c) it increases safety, for no one need stand on a platform during net hauling--everyone can stand on deck; and (d) it provides extra maneuverability, for the block can be swiveled on either quarter, enabling the skipper to have more control of his towing operations and permitting the net to be shot closer to wrecks where the best catches are.

Even if hydraulic power blocks are too expensive, power blocks of the older, more primitive type can be fitted to small boats. Using these gear- or rope-driven blocks is better than fishing without any power block, and they have many of the advantages of the hydraulic blocks.

The device will probably be used in the midwater region between the surface and about 100 fathoms. However, since the depth of the net can be adjusted rapidly, trawling within a fathom or two of the bottom, even over rough terrain, should be accomplished with little difficulty.

The specific goals of the designers were for a small, low-weight device that would be towed from the surface to 100 fathoms before the towing craft had traveled 300 fathoms and, in addition, reach the desired depth with a variance of not more than 1 fathom. It is not yet available on the commercial market.

[Abstracter: F. T. Pliskur]

The purpose of the study was to determine how long fresh albacore tuna could be held on ice at 32° F. and in refrigerated sea water at 30° F. before they become unfit for canning. The authors found that albacore stored for 29 days in ice and 35 days in refrigerated brine were near spoilage, but the fish were still fit for canning. They postulated that much of the undesirable flavors and odors were removed during the precooking step prior to canning. [2 tables, 10 references]

Crawford, Ladell, and Roland Finch (U.S. Bureau of Commercial Fisheries Technology Laboratory, Terminal Island, California)

QUALITY CHANGES IN ALBACORE TUNA DURING STORAGE ON ICE AND IN REFRIGERATED SEA WATER

2.00 (Cross Reference: 3.331)

2.1478 (Cross Reference: 1.84)

Overall drag efficiency on the level bottom was low--2.1 percent--but the efficiency increased progressively over the size range of scallops encountered (20 to 150 mm.). Direct observations by the SCUBA divers verified that the swimming activity of the scallops rather than selection by the drag gear was responsible for the low drag efficiency for the capture of scallops smaller than 100 mm.

The authors conclude that scallop dragging had three important effects in addition to the obvious reduction of population by capture: (1) indirect fishing mortality--scallops passing under the drag may be shell-damaged or may be forced into the bottom and the mantle cavity packed with sediment (Under these conditions they may be especially vulnerable to the predators, which tended to aggregate in the drag track.); (2) dislodgement of the dead shell to the substrate (soil surface; and (3) dispersion of the scallops resulting from their swimming activities. One overall likely result may be that the scallops will disperse from high-density areas to adjacent areas where the population has been reduced by dragging and eventually in this redistribution the scallop density may fall quickly below a commercially economic level for fishing with a relatively low reduction of stocks. [5 tables, 11 figures, 20 references]

2.146

slopes of 24 db per octave, though some higher frequency signals and complex sounds abstracted from tape recordings were also used.

The data revealed that low-frequency pulsed acoustic signals effectively attracted Nassau grouper, Epinephelus striatus; mutton snapper, Lutjanus analis; margate, Haemulon album; yellowtail snapper, Ocyurus chrysurus; yellowfin grouper, Mycteroperca venenosa; black grouper, Mycteroperca bonaci; and several unidentified species of groupers and snappers. Sharks were also frequently attracted, the most commonly observed being sharpnose shark, Rhizoprionodon sp.; reef shark, Garcharhinus sp.; and nurse shark, Ginglymostoma cirratum.

The results of the tests, though encouraging, are not considered decisive. The impulsive character of the signal is the primary attracting component, probably because it simulates the noise bursts that are normally generated hydrodynamically by the rapid acceleration and abrupt maneuvers of actively feeding fishes. Since the fishes' near-field perception depends on the signal wavelength, the effectiveness of an attractive signal should be increased by including low-frequency components. However, fish perceive high-frequency components more readily at a distance because of the sensitivity of the inner ear and because of a more favorable signal-to-ambient-noise relation. Thus, to be effective over a wide area, an attractive signal might need both high- and low-frequency components. The author suggests that the acoustic attraction would be much greater if bait were used as a supplementing stimulus. He believes that these acoustic attraction techniques are applicable to the commercial snapper and grouper fisheries now existing in the Gulf of Mexico and the Caribbean Sea. [24 references]

<div data-bbox="60 21 151 1056" data-label="Page-Header"> <div>2.1479</div> <div>CAN SKIN-DIVING FOR SCALLOPS PAY?</div> </div> <div data-bbox="151 21 226 1056" data-label="Text"> <p>Munday, G. R. World Fishing <u>17</u>, No. 9, 42-43 (September 1968)</p> </div> <div data-bbox="226 21 302 1056" data-label="Text"> <p>Diving for scallops on a commercial basis is being attempted by two men in Oban, Scotland. They can collect 50-60 doz. scallops in 1 day. The diving must be done in shifts, for someone is needed on the surface to pick up the diver if he should be carried away by tidal currents.</p> </div> <div data-bbox="302 21 483 1056" data-label="Text"> <p>The average dive is from 60 to 70 ft. in depth. The diver can see from 20 to 25 ft. around the spot where he is working. When on a workable bed, the scallops are not more than a few feet apart; so the diver works until his sack, which usually has a plastic buoy on the other end, is full. He then surfaces, receives another sack from his partner, and dives back to the scallop bed. When a diver becomes cold or tired or considers that he must surface for safety reasons, the men change places.</p> </div> <div data-bbox="483 21 650 1056" data-label="Text"> <p>Some general observations the men have made while locating scallop beds are: scallops are not found in dead water, but may be in odd pockets anywhere; all the beds worked were within 100 yards of shore or of offshore rocks; beds are usually located on shores that slope gently or where an eddy or swirl exists; beds do exist in flat areas, but scallops usually are not found over large flat areas; scallops seem to prefer some mud in the bed.</p> </div> <div data-bbox="650 21 725 1056" data-label="Page-Footer"> <div>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 5</div> <div>UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</div> <div>ABSTRACTER: S. G. Cordell</div> </div>	<div data-bbox="60 1056 151 2134" data-label="Page-Header"> <div>3.12</div> <div>USE OF EDTA COMPOUNDS FOR THE PRESERVATION OF HADDOCK FILLETS</div> </div> <div data-bbox="151 1056 226 2134" data-label="Text"> <p>Power, H. E., R. Sinclair, and K. Savagaon (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia) Journal of the Fisheries Research Board of Canada <u>25</u>, No. 10, 2071-2082 (October 1968)</p> </div> <div data-bbox="226 1056 529 2134" data-label="Text"> <p>Spoilage of fresh fish held in ice is caused primarily by growth of micro-organisms. Fish fillets, carefully handled to hold contamination to a minimum, will remain edible for up to 15 days' storage in ice. This storage period can be extended by applying a chemical preservative to the fish to slow the rate of growth of microorganisms. Some recent work has shown that low concentrations of tetrasodium ethylenediaminetetraacetic acid (Na<sub>4</sub>EDTA) in nutrient broth inhibited growth of three strains of <i>Pseudomonas</i> microorganisms involved in fish spoilage and that a 1 percent EDTA dip prolonged the storage life of chilled haddock fillets. Also, disodium EDTA (Na<sub>2</sub>EDTA) and disodium calcium EDTA (Na<sub>2</sub>CaEDTA) are used as additives for chelating metals in foods. The purpose of the present research was to show the effect of Na<sub>2</sub>EDTA, Na<sub>4</sub>EDTA, and Na<sub>2</sub>CaEDTA dip on the spoilage pattern of haddock fillets before and after cooking when stored in ice.</p> </div> <div data-bbox="529 1056 650 2134" data-label="Text"> <p>Fresh medium-size good-quality commercial fillets were dipped in the test solution for 20 sec., removed, and allowed to drain for 20 sec. The fillets were then packed individually in heat-sealed laminated, cellophane-polyethylene plastic bags without vacuum. Untreated samples for controls were packaged in the</p> </div> <div data-bbox="650 1056 725 2134" data-label="Page-Footer"> <div>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 5</div> <div>UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</div> <div>ABSTRACTER: F. T. Piskur</div> </div>
<div data-bbox="725 21 801 1056" data-label="Page-Header"> <div>3.12</div> <div>UPTAKE OF SODIUM AND PHOSPHORUS, AND WEIGHT CHANGES IN PRERIGOR COD MUSCLE DIPPED IN SODIUM TRIPOLYPHOSPHATE SOLUTIONS</div> </div> <div data-bbox="801 21 876 1056" data-label="Text"> <p>Sutton, A. H., and J. M. Ogilvie (Unilever Research Laboratory, Greyhope Road, Aberdeen, Scotland) Journal of the Fisheries Research Board of Canada <u>25</u>, No. 7, 1475-1484 (July 1968)</p> </div> <div data-bbox="876 21 1058 1056" data-label="Text"> <p>Polyphosphates added to fish muscle facilitate retention of the muscle's natural water during storage and reduction of its drip loss. Many authors have examined the commercial application of polyphosphates to fish; however, few have tried to precisely quantify the changes that take place during the dipping, freezing, and thawing cycles. An understanding of these changes is prerequisite to the formulation of more efficient treatments for fish muscle. The reaction of cod muscle to sodium tripolyphosphate is described in the present article.</p> </div> <div data-bbox="1058 21 1300 1056" data-label="Text"> <p>Cod (<i>Gadus morhua</i>) were killed and filleted. One fillet from each fish was treated immediately; the other was held on ice for 7 hr., the period of concern to fishermen who process and freeze the fish at sea. Cube-shaped, approximately 10-g. sections were cut from the middle of the fillets, weighed, dipped in varying solutions of sodium tripolyphosphate, removed and reweighed, suspended in the reagent for 2 min., removed, and reweighed. The muscle was then frozen for 24 hr. at -29° C., thawed for 24 hr. at 18° C. (during which time the drip was collected), and reweighed. Finally, the sodium was measured directly on a flame photometer; phosphorus was measured colorimetrically as the phosphomolybdate. For each experiment, one fillet was processed as an undipped control.</p> </div> <div data-bbox="1300 21 1360 1056" data-label="Page-Footer"> <div>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 5</div> <div>UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</div> <div>ABSTRACTER: L. Baldwin</div> </div>	<div data-bbox="725 1056 801 2134" data-label="Page-Header"> <div>3.12</div> <div>PENETRATION GRADIENTS OF SODIUM NITRITE AND SODIUM TRIPOLYPHOSPHATE IN HADDOCK FILLETS</div> </div> <div data-bbox="801 1056 876 2134" data-label="Text"> <p>Scheurer, Paul G. (U.S. Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Massachusetts 01930) Journal of Food Science <u>33</u>, No. 5, 504-506 (September-October 1968)</p> </div> <div data-bbox="876 1056 1058 2134" data-label="Text"> <p>Schmidt (1964, 1965) and Schmidt et al. (1964) have shown that various salts --for example, nitrites and polyphosphates--will inhibit or delay development of <i>Clostridium botulinum</i> organisms that have been inoculated into comminuted fish flesh. Little information, however, is available on the absorption characteristics, the distribution gradients, or the precise laboratory procedures for measuring the gradients of salts in whole fish fillets that have been dipped into a salt solution. Yet such information is needed to ensure that dipping procedures accord with Federal and State regulations.</p> </div> <div data-bbox="1058 1056 1300 2134" data-label="Text"> <p>In this article, a radioactive-tracer technique developed to measure the absorption and distribution of salts in fish flesh is described, and the results obtained by use of the technique are compared with those obtained by a modified colorimetric procedure for determining nitrite anion in meat (A.O.A.C., 1955). Sodium nitrite and sodium tripolyphosphate were made radioactive by irradiation with neutrons. Dip solutions of a desired concentration and radioactivity were prepared from mixtures of irradiated and nonirradiated salts, and portions of haddock fillets were dipped into a given solution. After either 10 sec. or 10 min. in the solution, the portions were removed, drained, and stored for 24 hr. at 33° F. in a moist desiccator. Then sections of core samples were weighed, and their</p> </div> <div data-bbox="1300 1056 1360 2134" data-label="Page-Footer"> <div>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 5</div> <div>UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</div> <div>ABSTRACTER: L. Baldwin</div> </div>

3.12 (Cross References: 3.239, 3.27)

The quantities of absorbed fluid were fairly constant, indicating that osmotic pressure differences are not the main driving force of the reaction. The weight of drip and the final weight of the muscle were clearly dependent on the concentration of the solution. The yield for muscle treated 0 hr. postmortem was no different than for that treated 7 hr. postmortem. The higher drip loss of the fillets treated 0 hr. postmortem and in the untreated controls reflects the changing biochemical properties of the muscle as it progresses into rigor. Calculations show that for each mole of sodium triphosphate in the thawed muscle about 240 moles more of water are present than in the muscles of the undipped controls.

The final concentration of sodium in the muscle increased for all concentrations of dip; however, a loss in phosphorus may occur from muscle that was dipped in dilute solutions. The concentration of sodium in the drip of the treated fish was always greater than in the controls; however, in the fish dipped 7 hr. postmortem, it was not clearly related to the concentration of the dip. The concentration of phosphorus in the drip of the fish processed 0 hr. postmortem increased slightly with the concentration of the dip, but that of the fish processed 7 hr. postmortem remained fairly constant.

From these results, the authors conclude that the uptake of ions into cod muscle during dipping, as well as their retention in the muscle after freezing and thawing, occurs in the same ratio as they are present in solution. The increase in fluid retention is proportional to the concentration of the ions. Apparently during dipping the polyphosphate anion and the muscle phosphate undergo an exchange reaction that causes a net loss of phosphorus from the muscle dipped in dilute solutions. [11 references]

2.1479 (Cross Reference: 1.84)

The divers have encountered many problems while diving. The cold water causes vast amounts of body heat to be lost; yet the diver is not aware of the loss, and, since the body's heat cannot be quickly restored, total exhaustion and helplessness may set in very rapidly. The best outfit, the divers found, is a wet suit, plus a pullover worn under a dry suit. Other problems include the bends, currents that can sweep a diver long distances underwater, minor physical disabilities that block the head cavities and prevent air from circulating, and weather.

Despite the perilous aspects of diving, there are some advantages of scalloping this way. Since the scallops are selected on the bottom, the smaller ones can remain undisturbed and continue to grow. (The destruction and damage caused by a dredger is eliminated.) Divers can work closer to rocks than a dredger can. Working thin beds is uneconomical, so overfishing is unlikely. In short, conservation is inherent in skin diving for scallops.

3.12 (Cross Reference: 7.49)

radioactivity was determined directly by counting. Simultaneously a 50  $\mu$ l. aliquot of the dip solution was placed on a planchet and its radioactivity determined.

Two solutions of sodium nitrite (containing Na<sub>2</sub>24) were used, one a 0.135 weight percent solution and the other a 0.262 weight percent solution. Data for the penetration of sodium nitrite into haddock fillets dipped into these two solutions showed that the concentration of salt in the fillets was directly proportional to the concentration of salt in the dip.

The penetration of sodium triphosphate into haddock fillets dipped in a 12.1 weight percent solution containing mostly P-32, but with some Na-24, was slight at the center of the fillet compared with the penetration of sodium nitrite. The concentration was highest at the surface, increasing as dip time increased; it decreased toward the center of the fillet, remaining fairly constant regardless of dip time.

All the data showed that penetration of salt after 10 min. was only about twice the penetration after 10 sec.; the initial rate, then, is probably quite high.

For comparison, the penetration of sodium nitrite was also determined colorimetrically. The colorimetric data were in general agreement with the data obtained by the radioactive-tracer method.

The author concludes that the radioactive-tracer method for determining distribution gradients is valid whenever the salt can be made radioactive by irradiation with neutrons. He cautions, however, that the isotopes used must have half-lives sufficiently long for experimental purposes. The distribution gradients can be determined by simple calculations if the standard solution is counted at the same time as the sample is; thus the more complex calculations based on the laws of radioactive decay are not necessary.

3.12

same manner. Samples were stored in ice at 0° C. Samples, for use as a reference for the taste panel, were frozen at -40° C. and stored at -26° C. subsequent to freezing. Samples were removed from storage twice weekly for chemical, microbiological, and organoleptic examination of the raw and the cooked fillet. Dips tested were (1) 0.5 percent Na<sub>4</sub>EDTA; (2) 0.75 percent Na<sub>4</sub>EDTA; (3) 1.0 percent Na<sub>4</sub>EDTA; (4) 1.0 percent Na<sub>2</sub>EDTA; (5) 0.5 percent Na<sub>2</sub>CaEDTA; and (6) 1.0 percent Na<sub>2</sub>CaEDTA.

A 1 percent solution of Na<sub>4</sub>EDTA used as a dip extended the storage life of haddock fillets in ice (0° C.) for 11 days over that of the untreated samples. The texture of the treated fillets was acceptable for their entire storage life. Haddock fillets treated with 0.5 and 0.75 percent Na<sub>4</sub>EDTA showed a storage life extension of 5 days, and those treated with 1 percent Na<sub>2</sub>EDTA an extended storage life of 6 days longer than the untreated (control) fillets. Fillets treated with 0.5 and 1.0 percent Na<sub>2</sub>CaEDTA solution dip showed only 0- and 1-day extension of storage life, respectively.

Trimethylamine (TMA) in the fillets increased during storage, but treatment with EDTA reduced the amount of the increase. The fillets treated with Na<sub>4</sub>EDTA had the lowest rate of increase of TMA. Samples were considered spoiled (organoleptically) when TMA values reached between 3 and 9.5 mg. TMA nitrogen per 100 g. of fish.

Treatment of haddock fillets with EDTA dips had little or no effect on the growth of the bacterial population. [6 tables, 5 figures, 9 references]

<p>3.15 RADIATION PRESERVATION OF PACIFIC COAST FISHERIES PRODUCTS</p> <p>Miyauchi, D., J. Spinelli, G. Pelroy, and M. A. Steinberg (U.S. Bureau of Commercial Fisheries Technological Laboratory, Seattle, Washington 98122) <i>Isotopes and Radiation Technology</i> <u>5</u>, No. 2, 136-141 (Winter 1967-1968)</p> <p>The authors review results of experimental work on irradiation preservation of Pacific Coast fish and shellfish products at the Bureau of Commercial Fisheries Technological Laboratory, Seattle, Washington, during the period 1963-67. The goal was to advance radiation processing of selected seafood products to be able to place such irradiated food on the commercial market. This goal included clearance by the Federal Food and Drug Administration.</p> <p>Tests were carried out using petrale sole (fillets), English sole (fillets), Pacific ocean perch (fillets), halibut (steaks), Dungeness crab meat, king crab meat, and Pacific oyster meat. These species were selected because their seasonal production and market demands would provide for an optimum year-round commercial irradiation processing schedule.</p> <p>Although there were variations by individual marine species in response to irradiation treatment, in general irradiation of Northeast Pacific Ocean marine products with doses of 0.1 to 0.2 Mrad gave acceptable products with shelf life sufficient to allow distribution under refrigerated (chilled) conditions anywhere (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 7 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: F. T. Piskur</p>	<p>3.239B CONDITION OF NEWFOUNDLAND TRAP-CAUGHT COD AND ITS INFLUENCE ON QUALITY AFTER SINGLE AND DOUBLE FREEZING</p> <p>MacCallum, W. A., June I. Jaffray, and D. N. Churchill (Fisheries Research Board of Canada Technological Unit, St. John's, Newfoundland) <i>Journal of the Fisheries Research Board of Canada</i> <u>25</u>, No. 4, 733-755 (April 1968) (Continued)</p> <p>The next best product was that double-frozen from chilled, prerigor fish. Fish that were frozen prerigor in dressed condition, stored at -23° C. for 16 weeks, then thawed, processed, and refrozen, were equal in quality to the once-frozen controls. After a further 10 weeks of storage, the texture in the twice-frozen material from iced, prerigor-frozen fish dropped: the product was considered little better than the twice-frozen product that had been handled in a commercial-like manner. A satisfactory double-frozen product was obtained by holding unfiletted blocks of noniced, gutted fish at -46° C. before thawing and refreezing, followed by storage at -23° C. Such low-temperature storage is not within the capability of present commercial operations.</p> <p>With prerigor and inrigor frozen material, correlation was found between (1) thaw-drip and pH, (2) thaw-drip and overall texture (inrigor freezing only), (3) pH and overall texture, and (4) pH and toughness. There was a correlation between EPN values and overall texture scores of fish frozen in various stages of rigor, but there was none between EPN and overall acceptability. With twice-frozen fillets prepared from material handled unrefrozen, there was significant correlation (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 7 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: F. T. Piskur</p>
<p>3.239A CONDITION OF NEWFOUNDLAND TRAP-CAUGHT COD AND ITS INFLUENCE ON QUALITY AFTER SINGLE AND DOUBLE FREEZING</p> <p>MacCallum, W. A., June I. Jaffray, and D. N. Churchill (Fisheries Research Board of Canada Technological Unit, St. John's, Newfoundland) <i>Journal of the Fisheries Research Board of Canada</i> <u>25</u>, No. 4, 733-755 (April 1968)</p> <p>It has been found that various factors, such as the physiological condition of the muscle of fish (cod) at capture and the season that the fish are caught, may affect the keeping quality of the fish during frozen storage. The present report describes additional studies on the effect on cold-storage keeping quality of cod of condition of fish during the catching seasons and after single and double freezing.</p> <p>Trap-caught cod (<i>Gadus morhua</i>) that were unfrozen, once frozen, or twice frozen were used. The fish were processed before and during rigor, after icing, or after handling without ice, at various times during the trap fishing season. Quality assessments of the fish were based on organoleptic evaluations and chemical tests. The latter included pH, thaw- and free-drip, adenosine 5'-triphosphate (ATP), lactate, extractable protein nitrogen (EPN), free fatty acid (FFA), and glycogen determinations.</p> <p>Lactate concentrations and pH in the whole fish at killing varied with the season. Lactate concentrations correlated with pH measurements in freshly killed fish and the freshly frozen fillets that had been frozen both before and during (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 7 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: F. T. Piskur</p>	<p>3.249 RELATION BETWEEN PROTEIN EXTRACTABILITY AND FREE FATTY ACID PRODUCTION IN COD MUSCLE AGED IN ICE</p> <p>Anderson, Margaret L., and Elinor M. Ravesi (U.S. Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Massachusetts) <i>Journal of the Fisheries Research Board of Canada</i> <u>25</u>, No. 10, 2059-2069 (October 1968)</p> <p>Protein extractability of cod muscle decreases in frozen storage and in ice storage. It has been postulated that protein-free fatty acid (FFA) interaction is involved in this loss in protein extractability [and concomitant loss in quality]. However, in the presence of similar FFA contents, loss of protein extractability is greater in frozen storage than in storage in ice. The purpose of this research was to explain this phenomenon by determining in muscle aged in ice (1) the relation of the FFA content of the muscle to protein extractability, (2) the extent to which FFA released during aging is associated with the water soluble (sarcoplasmic) proteins, and (3) the effect on protein extractability of added bovine serum albumin (BSA) (a free fatty-acid acceptor) and of prolonged exposure to the extractant employed and to extractant of higher ionic strength.</p> <p>Commercial samples of gutted cod (<i>Gadus morhua</i>) weighing 15-25 lb. were used. Methods of determining soluble protein, readily extractable protein, and nonprotein nitrogen; content; of preparing lipid extracts and phospholipid-free fractions; of determining free fatty acid; and of conducting sedimentation tests are described. (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 7 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: F. T. Piskur</p>

3.239A (Cross References: 3.249, 8.8)

rigor. The rate of accumulation of lactate was slowed in the fish iced immediately after killing. Differences in the state of the chilled fish that were frozen prerigor or in rigor--as determined by muscle glycogen, lactate, and reserves of ATP--were reflected in differences in texture, thaw-drip, and pH. Patterns in texture may be predicted from the amount of thaw-drip and the pH in the cold-stored pack.

Mealiness and short-grained features in freshly frozen (once) cod were correlated with the level of ATP immediately after cooking. Prerigor frozen fillets toughened slowly during storage at  $-23^{\circ}\text{C}$ ., and the mealiness eventually disappeared. Hence fish downgraded for texture at freezing improved or maintained initial overall texture scores during 6 months of storage. There was a clear preference for fish frozen prerigor; the next best once-frozen was chilled in-rigor fish.

(Continued on Card 8.8B)

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in the United States. The results of preference tests indicated no significant difference between fresh frozen fish and those that had been irradiated and stored at refrigerator temperature for 4 weeks.

The fish can be irradiated in consumer-size retail packages or in the larger wholesale units. In order to prevent or retard development of oxidative rancidity, some fishery products must be wrapped in oxygen-impermeable packaging material and packed under vacuum or in intimate contact with the packaging material.

To test the effect of atmosphere during irradiation, fish fillet products were irradiated in nitrogen, carbon dioxide, and helium. The fillets irradiated in a helium atmosphere were equivalent to the fillet products irradiated under vacuum; irradiation in nitrogen or carbon dioxide offered no protection to the irradiated fishery products.

Treatment of the fish fillets prior to irradiation by dipping them in a sodium tripolyphosphate-salt solution was effective in minimizing the drip from the fillets during storage. This treatment also helped to preserve the original appearance and texture in the halibut and Pacific ocean perch fillet products.

The effect of storage conditions on the microflora of irradiated fish has not been fully investigated, and studies are in progress. Results so far indicated that the predominant spoilage organism of irradiated fish at the refrigeration storage temperature was *Lactobacillus*.

The authors conclude that the conditions for the processing of a commercially acceptable chilled irradiated fishery product have been developed and that consideration should now be given to large-scale distribution studies.

3.249

The amount of extractable protein decreased as FFA was produced in cod muscle stored in ice. The amount of the decrease was small compared with that occurring in frozen-stored muscle of similar FFA content. Prolonged extraction of the muscle with neutral salt solution in the presence, and the absence, of BSA demonstrated that the loss in protein extractability in muscle stored in ice was reversible through dissociation of the inextractable material and that the presence of BSA favored greater dissociation of this inextractable material. Ultracentrifugal patterns of the protein extracted from the muscle showed increasing polydispersity as aging of the muscle in ice progressed. The inextractable material contained in the muscle fragments, as determined by phase contrast microscopy, consisted of bundles of myofibrils, some of full fiber width. In cod muscle stored in ice, the interaction of contractile protein with FFA produces a cross-linking network within the muscle fiber, causing resistance to fragmentation and to protein extractability, and the smaller loss of protein extractability during aging in ice is in part due to dissociation occurring during the extraction. The authors postulate that the greater loss in extractable protein in cod muscle aged in the frozen state is due to increased reaction between contractile protein and FFA and the stabilization of the complexes formed. [7 figures, 2 tables, 18 references]

3.239B (Cross References: 3.249, 8.8)

between EPN values at tasting and overall texture scores, and between EPN and acceptability scores.

FFA values of the fish were high and did not increase as a result of thawing and refreezing or further storage at  $-23^{\circ}\text{C}$ . or with prerigor or inrigor freezing. Storage at  $-46^{\circ}\text{C}$ . showed less FFA development.

With the June-caught, once-frozen cod, the correlation between EPN and FFA was significant; for June- and July-caught fish, there was significant correlation between FFA and taste scores, but no correlation between FFA and overall texture scores. For the twice-frozen fish of any particular prefreezing treatment, there was no correlation between FFA and taste, overall texture, or overall acceptability. [20 references]

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THAW DRIP IN FROZEN AMERICAN PLAICE FILLETS,  
ITS SEASONAL VARIATION AND DEVELOPMENT DURING STORAGE

Dyer, W. J., and Doris I. Fraser (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia); M. Greenwell (Sea-Sealed Division, National Sea Products, Halifax, Nova Scotia)  
Journal of the Fisheries Research Board of Canada 25, No. 4, 829-833 (April 1968)

The amount of drip formed on thawing frozen fish varies with such factors as freezing and storage conditions, and the characteristics and prefreezing condition of the fish samples. The combination of conditions may give large amounts of drip in one sample of a product and small amounts in another. Holding time prior to freezing and storage temperature appear to be major factors, but few definitive data are available on the effect of these for a particular fish product. Flounder filets have a rather high thaw drip potential; consequently, they pose an important problem in commercial handling. Therefore, the American plaice (*Hippoglossoides platessoides*) was used to determine the effect on thaw drip of season, time in commercial storage at about -20° C., and brining control measures.

Filletts were processed from plaice obtained about monthly from February 1965 to February 1966 from Grand Banks to George's Banks. Commercial methods of brining, packaging, freezing, and storage were used. The samples were examined after 1 week, 4, 8, and 12 months of storage.

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 9  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: F. T. Piskur

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APPLICATION OF 5'-RIBONUCLEOTIDES TO CANNED SEA-FOODS

Hashida, Wataru, Takenori Mouri, and Iwao Shiga (Toyo Junior College of Food Technology, Kawanishi-City, Hyogo, Japan)  
Food Technology 22, No. 11, 102-107 (November 1968)

5'-Ribonucleotides have been used as flavor enhancers in certain canned vegetables. In this report the authors describe the application of 5'-ribonucleotides to four canned seafood products--short-necked clam (*Venerupis semide-cusata*), red crab (*Venerupis armatus*), oyster (*Ostrea gigas* [gigas]), and whale [species was not indicated]. The meats were experimentally packed with added amounts of 5'-ribonucleotides in lacquered tin cans and processed according to commercial procedures. Sodium salts of 5'-inosine monophosphate (5'-IMP), 5'-guanosine monophosphate (5'-GMP), and "Ribotide" (1:1 mixture of 5'-IMP and 5'-GMP) were used. The canned products were stored at room temperature for 6 months then examined organoleptically using the paired-preference test and ranking test and chemically for content of 5'-nucleotides.

Taste of the canned products was enhanced at the following levels: 0.04 and 0.08 percent of Ribotide for short-necked clam; 0.04 and 0.08 percent of Ribotide for red crab meat; 0.1 percent of 5'-IMP, 0.1 percent of 5'-GMP, or 0.2 percent of Ribotide for whale meat. Experiments to measure the stabilities of added 5'-ribonucleotides during heat processing and storage of the products showed that

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 9  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: F. T. Piskur

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THE MECHANISM OF SULFIDE STAINING IN TIN FOODPACKS

Seiler, B. C. (Homer Research Laboratory, Bethlehem Steel Corporation, Pennsylvania 18016)  
Food Technology 22, No. 11, 91-95 (November 1968)

Sulfide stain from tinplate (hot-dipped) used in pork and ham-pea soup foodpacks was examined by X-ray, infrared, and chemical analyses. Tests with these packs are used commercially to determine whether the degree of passivity on a tinplate surface meets the requirements of the industry. Pork is used to check for underfilm staining in cans coated with c-enamel; ham-pea soup is used in uncoated cans.

The sulfide stain formed in the test pack was identified as stannous sulfide. Grains with the (220) and (321) crystal plane orientation were preferentially stained whereas those with (112) orientation were stable--the same crystal planes preferentially stained in grapefruit and prune juice packs. In the fruit-juice tests a galvanic potential was demonstrated between the easily detinned planes and the more stable planes. This suggests that an electrochemical mechanism may be responsible not only for detinning but also for sulfide staining in view of the similarity in preferential attack of the crystal planes. Possible causes for the differences in susceptibility of various planes to attack are discussed. The author points out that in certain food media, for example, fish and shrimp, the differences between the tin crystal planes may be less important than (over)

\*Item on back of card.

COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 9  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: F. T. Piskur

3.5

SALTING AND DRYING FISH. 3. DIFFUSION OF WATER

Del Valle, F. R., and J. T. R. Nickerson (Department of Nutrition and Food Technology, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139)  
Journal of Food Science 33, No. 5, 499-503 (September-October 1968)

In a number of theoretical studies on the drying of fish, including heavily salted fish, Jason (1958) found that drying occurs in two stages. Drying in the first stage, a constant-rate period, is controlled solely by the conditions of the ambient atmosphere; it is equal to the drying from a saturated water surface of the same shape as the fish. Drying in the second stage, a falling-rate period, occurs in two distinct phases, each of which is characterized by a Fickian water-diffusion coefficient. Both these diffusion coefficients are isotropic, depend on the fat content of the fish, and follow an Arrhenius-type variation with temperature. However, the coefficient for the first falling-rate period is greater than that for the second falling-rate period. The diffusion coefficient for the first falling-rate period for heavily salted fish is roughly equal to that for unsalted fish; whereas the coefficient for the second falling-rate period for salted fish is considerably lower than that for unsalted fish. Salted fish enter the second falling-rate period sooner than unsalted fish do.

The present authors report the results of work done to determine the effect on the diffusion coefficients for both falling-rate periods in the drying of salted muscle from swordfish (*Xiphias gladius*) of drying temperature, degree of salting, and degree of hydration of the muscle (varied by addition of an acid, a base, or a phosphate to the salted muscle).

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 9  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: L. Baldwin

DRIP IN STORED FROZEN PLAICE FILLETS

ENHANCING FLAVOR OF CANNED SEAFOODS

SULFIDE STAINING IN TIN FOODPACKS

WATER DIFFUSION IN DRY SALTED FISH

## 3.2499

#### IV - THE CHANGES IN ORGANIC ACID CONTENT IN BABY CLAMS DURING STORAGE

Osada, Hiromitsu, Ikuko Goto (Toyo Food Ind. Coll., Kawasetsu, Japan)  
Chemical Abstracts 69, No. 3, 9804x (July 15, 1968)

Food Technology 22, No. 10, 33-37 (October 1968)

The authors describe laboratory scale tests of a new method for freeze drying of foods. By this process, the desiccant (molecular sieve) and frozen food are combined into a mixed bed through which a mixture of gases (80 percent helium and 20 percent nitrogen) under reduced pressure is circulated. A patent application is pending with rights assigned to the U.S. Department of Agriculture (USDA). USDA plans to conduct large-scale development tests on the new process.

[1 table, 7 figures, 11 references]

[abstractor: F. T. Piskur]

2499 (Cross Reference: 0.6)

THE DEVELOPMENT OF DIMETHYLAMINE AND FORMALDEHYDE  
IN ALASKA POLLACK MUSCLE FROZEN STORAGE.  
III - EFFECT OF VARIOUS KINDS OF ADDITIVES

Tokunaga, Toshio (Hokkaido Reg. Fish. Res. Lab., Yoichi, Japan)  
Chemical Abstracts 69, No. 25, 105157j (December 16, 1968)

Tokunaga, Toshio (Hokkaido Reg. Fish. Res. Lab., Yoichi, Japan),  
Obayashi, Akimasa (60 No. 35, 1051574 (December 16, 1968)

those due to the inherent differences between tin and steel. In certain fish and shrimp packs, it has been found, for example, that iron sulfide forms from the reaction between the tin coating and the steel base during canning or during storage--the sulfide ions for the reaction arise from the reduction of sulfur-bearing amino acids in the fish. The author suggests, however, that his work indicates that there may be a possible need for reinvestigation of certain cases where iron has been implicated in sulfide staining.

Thaw drip loss in packaged (1 lb.) American plaice fillets stored at  $-20^{\circ}\text{C}$ . was high, averaging 16 percent. About 11 percent of drip took place after 1 week; the amount increased about 40-45 percent between 1 week and 4 months and then remained constant for the remaining 8 months. Dipping in 20 percent salt solution did not reduce drip significantly. Variations in time of fish in ice on the vessel, 3-9 days, and season of year the fish were caught, had no apparent effect on thaw drip. (17 references)

3.338

3.2499

second diffusion coefficient behaved [2 tables, 4 figures, 10 references]

Because of the long drying times, determinations for the diffusion coefficient for the second falling-rate period were subject to rather large errors, the values obtained serving mainly to indicate trends. In general, however, the second diffusion coefficient behaved essentially like the first.

3,2349

ACCELERATING FREEZE-DRYING THROUGH IMPROVED HEAT TRANSFER

Kan, B. (American Machine and Foundry Company, Springfield, Connecticut), and F. de Winter (Jet Propulsion Laboratory, Pasadena, California)  
Food Technology 22, No. 10, 67-76 (October 1968)

Food Technology 22, No. 10, 67-76 (October 1968)

The water-diffusion coefficient for the first falling-rate period is a function of the degree of salting--first increasing, then passing through a maximum, and finally decreasing with degree of salting--and is directly correlated with the degree of hydration of the muscle. At a low degree of salting, addition of acid decreased the coefficient, whereas addition of base or phosphate increased it. At a very high degree of salting, addition of neither base nor phosphate had any noticeable effect, but at an intermediate degree of salting, addition of any of the substances seemingly caused a decrease of the coefficient. These variations are apparently attributable to the hydration dependence of the coefficient. At all degrees of salting, the coefficient increased with temperature.

The heat transfer and fluid flow mechanisms involved in the "radiant" food freeze-drying process were studied to determine which are the rate-limiting mechanisms. The results showed that the process was limited by the conduction through the dried food, which was in turn determined by the thermal conductivity of the dried food in the presence of water vapor. The authors found that the conductivity of the dried food (and drying rate) was increased by two or three times by surrounding the food with either helium or hydrogen. The authors describe in some detail the specialized gas circulation equipment that would be necessary in a commercial operation. [11 figures, 9 references]

[Abstracter: F. T. Piskur]

3.5 (Cross Reference: 3.6)

3.336 (Cross Reference: 7.8)

Uniform slices of swordfish (4 cm. in diameter, 0.5 cm. thick, and having a fat content of from 2 to 3 percent) were salted in brines of different salt concentrations (0.5 molal, 2.5 molal, or saturated) or in these brines with hydrochloric acid (0.05 molar), sodium hydroxide (0.05 molar), or sodium tripolyphosphate (5 percent) added. After the slices were removed from the brine and blotted, they were placed in a drying tunnel and fan dried for 3 hr. at 40° or 55° C. To suppress the drying that occurs in the constant-rate period—that is, to begin the drying in the falling-rate period, where diffusion controls—the authors used high air velocities to increase surface evaporation rates relative to diffusion rates.

the nucleotides were fairly stable. Canned red crab meat stored 28 days showed a retention of 77 to 88 percent of added nucleotides; canned short-necked clams stored 189 days showed a retention of 52 to 61 percent.

4.11 FATTY ACID COMPOSITION OF ESTERS IN FISH LIVER.  
(\*) I - SEPARATION OF FATTY ACID OF VITAMIN A1 ESTER

Hata, Masahiro, and Mitsuo Hata (Department of Fisheries, Faculty of Agriculture, Tohoku University, Sendai, Japan)  
Tohoku Journal of Agricultural Research 18, No. 3, 225-231 (October 1967)

Isolating the vitamin A1 esters from liver oil by such ordinary methods as alumina column chromatography or thin-layer chromatography (TLC) is quite difficult, for the fraction isolated contains both cholesterol esters and wax esters. In 1964, Futterman and Andrews isolated the vitamin A1 esters from the retina of five mammals and a trout by using alumina column chromatography and silica gel TLC; they then analyzed the fatty acids by gas-liquid chromatography (GLC). However, since the vitamin A1 esters cannot be completely separated from the wax esters, the method they used is practical only if small amounts of wax esters are present.

In 1963, Kinumaki et al. used a dehydration reaction to analyze the fatty acids obtained from vitamin A1 esters of fish liver oils. They separated the vitamin A1 esters into anhydrovitamin A1 and free fatty acids by using a benzene solution and acetyl chloride as a catalyst and then analyzed the fatty acids by GLC. Although the method is good, it cannot be used with samples that contain small amounts of vitamin A1 esters.

The present authors found that p-toluenesulfonic acid was a suitable catalyst in the dehydration reaction of vitamin A and that, by use of this catalyst, they

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COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 3 PAGE 11  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: F. T. Piskur

4.13 DISTRIBUTION OF FATTY ACIDS IN COD FLESH LIPIDS

Addison, R. F., R. G. Ackman, and J. Hingley (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)  
Journal of the Fisheries Research Board of Canada 25, No. 10, 2083-2090 (October 1968)

Although lipids are present only in small amounts (0.5-0.7 percent) in the flesh of cod (*Gadus morhua*), they have considerable influence on the quality of the stored fillets. Cold storage of cod is accompanied by autolytic hydrolysis of the flesh lipids, and the resulting accumulation of free fatty acids cause deterioration of quality of the fillets. Establishment of the distribution of the fatty acids among fresh cod flesh lipid fractions is an essential step toward an understanding of the course of autolysis. The purpose of this present study was to determine the fatty acid composition of the major flesh lipids of cod (*G. morhua*), to compare these results with similar analyses reported elsewhere, and to discuss the relevance of the available data on lipid autolysis.

The lipids from the flesh (fillets) and the liver of fresh cod were extracted by the method of Bligh and Dyer (1959). The fatty-acid composition of the flesh and liver lipids were determined by gas-liquid chromatography (GLC). The cod flesh lipids were separated by silic acid chromatography into eight fractions; the fatty-acid distribution in five of these fractions (sterol esters, triglycerides, ethanolamine phosphatide, serine phosphatide, and choline phosphatide) was examined by GLC.

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COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 3 PAGE 11  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: F. T. Piskur

FATTY ACID ANALYSIS OF VITAMIN A ESTERS  
FATTY ACIDS IN COD FLESH LIPIDS

4.15 FATTY ACID COMPOSITION OF ESTERS IN FISH LIVER.  
(\*) II - EEL (*ANGUILLA JAPONICA*) LIVER  
AND *CHANNA ARGUS* (CANTOR) LIVER

Hata, Masahiro, and Mitsuo Hata (Department of Fisheries, Faculty of Agriculture, Tohoku University, Sendai, Japan)  
Tohoku Journal of Agricultural Research 18, No. 4, 267-273 (December 1967)

Because the esters in fish liver have different molecular structures, metabolic pathways, and physiological functions, their fatty-acid composition may also be different. Moreover, since the fatty-acid composition of the lipids from marine fishes is different from that of fresh-water fishes, the fatty-acid composition of the esters may also be different. To examine these possibilities, the authors studied the fatty-acid composition of triglycerides, cholesterol esters, and vitamin A esters of the liver of two fresh-water fish, an eel (*Anguilla japonica*) and *Channa argus* [snakehead]. The vitamin A in the liver of fresh-water fish is composed of vitamin A1 and vitamin A2. The vitamin A1 ester is very difficult to separate from the vitamin A2 ester. Therefore, the eel was chosen because most of the vitamin A in its liver is A1; the snakehead because most of the vitamin A in its liver is A2.

Following extraction and fractionation of the lipids, the fatty acids of the eel's vitamin A1 esters were prepared according to the method described by the authors in 1967 using p-toluenesulfonic acid as a catalyst. The fatty-acid

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COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 3 PAGE 11  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: F. T. Piskur

4.21 METAL CATALYZED LIPID OXIDATION  
(\*)

Marcuse, R.  
Food Technology 22, No. 11, 30, 34-35 (November 1968)

This is a review of the papers presented at the symposium held at the Swedish Institute of Food Preservation Research, Göteborg. The purpose of the symposium was to describe the state of the field of metal catalyzed lipid oxidation. It considered three main areas: analytical methods, research in model systems, and food problems.

Papers on analytical methods based on atomic absorption, activation analysis, and electron spin indicated enhanced capabilities for investigating the occurrence and significance of trace metals. Other papers dealt with determination of oxygen consumption as a measure of fat oxidation.

Papers on model system studies concerned effect of metals at low oxygen pressure on fat oxidation, influence of metals on antioxidants, specific catalytic effect of metal chelates on lipid oxidation, and the effect of heme compounds on the stability of animal products. Papers on food problems concerned metal catalyzed lipid oxidation in animal and dairy products including fish products.

The papers are for sale for S.kr 40.0 from the Institute at Fack, S400, 21 Göteborg 16, Sweden.

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COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 3 PAGE 11  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: F. T. Piskur

FATTY-ACID COMPOSITION OF FISH LIVER ESTERS  
METAL CATALYZED LIPID OXIDATION

## 4.13 (Cross Reference: 1.51)

Compared with the fatty-acid composition of flesh lipids (total), the sterol esters contained less 16:0 and more 20:5 $\omega$ 3; ethanolamine phosphatides contained less 16:0, less 20:5 $\omega$ 3, and more 22:6 $\omega$ 3; serine phosphatides contained less 16:0, less 20:5 $\omega$ 3, and more 18:0; and choline phosphatides had a composition similar to that of the total flesh lipid but contained slightly more 16:0 and 20:5 $\omega$ 3, and less 22:6 $\omega$ 3. The triglycerides more closely resembled liver lipid in fatty-acid composition than any other of the flesh lipid fractions. There was a basic similarity between these results and those obtained by other researchers in the fatty-acid composition of individual phospholipids from various species of fish.

The authors postulate, in agreement with other researchers, that the flesh lipids of cod and other lean fish probably do not represent an energy reserve. Further, the basic similarity in fatty-acid composition of individual phospholipids from various species of fish suggests that these compounds have a common function(s). Results of other work seem to substantiate the belief that phospholipids as a group are involved in membrane structure, electron transfer, and that lecithin is involved in the solution and concentration of enzymes. The authors conclude that, although the significance of fatty-acid distribution in individual lipids is not yet understood, it should become more clear as the biological roles of lipids are elucidated. [ 4 ] tables, 24 references]

## 4.14 (Cross Reference: 4.15)

could analyze the fatty acids of small amounts of vitamin A1 esters quantitatively in the presence of cholesterol and wax esters. The esters of fish liver oil were separated into anhydrovitamin A1 and free fatty acid in benzene solution, in the presence of p-toluenesulfonic acid as catalyst. The reaction conditions found suitable were: temperature 60° C., reaction time 8-10 min., vitamin A1 esters concentration 3-15 mg/ml of benzene, and catalyst 15-20 mg. Wax esters and cholesterol esters did not split any free fatty acids by this reaction. By this method, small amounts of vitamin A1 esters can be analyzed--the minimum quantity required depends entirely on the minimum quantity of fatty acids required by GLC analysis.

The fatty acid composition of vitamin esters in the liver oil of bonito was analyzed by this method. The major fatty acids present were saturated ones; they constituted about 79 percent of the total. Major concentrations of fatty acids were: palmitic 57 percent, oleic 15 percent, and palmitoleic 8 percent. The amount of polyunsaturated fatty acids was insignificant. [ 4 ] references]

Schober, B.  
Chemical Abstracts 69, No. 1, 1625j (July 1, 1968)

APPLICATION OF A REFRACTOMETRIC METHOD  
FOR RAPID DETERMINATION OF FAT CONTENT IN FISH  
AND FISH PRODUCTS. I - DETERMINATION OF THE FAT CONTENT  
IN HERRING

## 4.11

4.22 SELECTIVE HYDROGENATION OF ESTERS  
OF POLY-UNSATURATED FATTY ACIDS

British Patent 1,080,891

Journal of the Science of Food and Agriculture 19, No. 8, 1195 (August 1968)

The esters (for example, desulfurized marine oil) are hydrogenated in presence of conventional hydrogenation catalysts (Ni) in additional presence of an organic compound that is nonacid and contains 1 alcoholic OH group (for example, a 3-8 C alkanol or methoxy-ethanol). With this method, the polyunsaturated acid groups can be selectively hydrogenated to mono-unsaturated acid groups at the expense of reduction of mono-unsaturated acid groups to saturated acid groups. The products formed have lower softening points than those formed in the absence of the organic compounds, and they are almost completely liquids of better keeping properties than the initial ester mixtures. [Abstracter: F. T. Piskur]

## 4.15

mixture of vitamin A2 esters, the cholesterol esters, the triglycerides, and the muscle lipids of the snakehead were saponified in  $\frac{1}{2}$ N KOH-EtOH at 70° C. for 90 min.

In the eel liver, the proportion of saturated fatty acids in the vitamin A esters was slightly high, and the major fatty-acid components were C16:0, C18:1, and C16:1. The proportion of unsaturated fatty acids in the cholesterol esters was slightly high, and the major components were C16:0, C18:1, and C20:1 (18:3). The fatty-acid composition of the triglycerides in eel liver was similar to that of muscle lipids, and major components were C18:1, C16:0, and C16:1.

In the Channa argus [snakehead], the vitamin A2 esters contained a high proportion of saturated acids, and major components were C16:0, C16:1, and C18:1. The cholesterol esters were considerably saturated, containing an unusually large amount (up to 30 percent) of C24:0. The triglycerides were more unsaturated, and major components were C18:1 and C16:0.

The esters of the livers of both fish contained an insignificant amount of polyunsaturated fatty acids. The muscle lipids of both fish were more unsaturated and had the usual composition of fish oil. [ 3 tables, 1 figure, 18 references ]

## 4.15 SQUALENE CONTENT OF SHARK LIVER OIL

Perepletchik, R. R., and A. A. Karasikova (U.S.S.R.)  
Chemical Abstracts 69, No. 24, 97865w (December 9, 1968)

## SELECTIVE ESTER HYDROGENATION

## SQUALENE CONTENT OF SHARK-LIVER OIL

## DETERMINATION OF FAT CONTENT IN HERRING

4.5	<p>HEAVY METAL IONS AND THE DEVELOPMENT OF RANCIDITY IN BLENDED FISH MUSCLE</p> <p>Castell, C. H., and D. M. Spears (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia) <i>Journal of the Fisheries Research Board of Canada</i> <u>25</u>, No. 4, 639-656 (April 1968)</p> <p>Some heavy metal ions catalyze oxidation of lipids, and their presence is potentially detrimental to the keeping time of fats, oils, and fatty foods. The catalytic effect of metal ions on lipids as they exist in muscle, particularly in muscle of relatively low fat content, is not well known. These metals, in addition to reacting with lipids, may form complexes and react with other compounds that are found in animal tissue. Under these conditions, particularly in foods containing much nonfat material, the heavy metal present may be found in inactive forms and be unable to function as a catalyst for lipid oxidation. Therefore, there would probably be no correlation between the amount of metal and the keeping quality of the food. The purpose of this study was to determine the comparative effect of heavy metal ions on the development of oxidative rancidity in the muscle of different species of commercial fish and other marine animals.</p> <p>Ten different heavy metal ions were added in concentrations of from 1 to 50 p.p.m. to blended muscle (in prerigor condition) taken from freshly killed cod, haddock, flounder, redfish [ocean perch], herring, mackerel, and scallop, and stored for 24 hr. at 0° C. Oysters were included as a matter of interest, and in this case the whole shucked meats were used. The rancidities that developed were determined by thiobarbituric acid (TBA) values and by odors.</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p>	<p>ABSTRACTER: F. T. Piskur</p>
4.90	<p>SERUM ENZYME CHANGES, MUSCULAR DYSTROPHY AND ERYTHROCYTE ABNORMALITIES IN LAMBS FED ON DIETS CONTAINING COD-LIVER OIL AND MAIZE OIL, AND THE THERAPEUTIC EFFECT OF VITAMIN E</p> <p>Boyd, J. W. (Biochemistry Department, ARC Institute of Animal Physiology, Babraham, Cambridge, England) <i>British Journal of Nutrition</i> <u>22</u>, No. 3, 411-422 (September 1968)</p> <p>Previous work has shown that experimental animals develop muscular dystrophy when the ratio of vitamin E to polyunsaturated fat in their diet is low. Although human beings maintained on such diets evidence no signs of muscular dystrophy, there may be an increased susceptibility to in vitro hemolysis by peroxide. Certain other workers observed edema, skin lesions, and increased sensitivity to peroxide hemolysis in human infants fed a milk mixture with a low ratio of vitamin E to polyunsaturated fat. The purpose of the present study was to determine if increased susceptibility to peroxide hemolysis occurred in lambs fed milk containing either maize oil or cod-liver oil, and if acute muscular dystrophy with raised serum enzyme levels would occur in lambs on the maize-oil diet.</p> <p>Sixteen lambs between 4 and 13 days old were divided into four groups, housed, bedded on sawdust, and bottle fed to appetite three times a day for 80 days. The first group was fed skim milk containing cod-liver oil; the second group, skim milk containing maize oil; and the third group skim milk containing</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p>	<p>ABSTRACTER: F. T. Piskur</p>

# FISH MUSCLE RANCIDITY

EFFECTS OF DIETARY LIPIDS ON LAMBS AND THERAPEUTIC EFFECT OF VITAMIN E

6.190	<p>THE NUTRITIVE CONTENT OF PERUVIAN ANCHOVY FISH MEAL EVALUATED BY CHEMICAL METHODS</p> <p>Kifer, R. R., W. L. Payne, P. E. Bauersfeld, and M. E. Ambrose (U.S. Department of the Interior, College Park, Maryland) <i>Feedstuffs</i> <u>40</u>, No. 35, 32-33 (August 31, 1968)</p> <p>Despite the fact that Peruvian anchovy fish meal fills nearly half the world's fishmeal requirements, few data have been published describing its chemical content. The investigation reported here was made to remedy this deficiency.</p> <p>Twenty-five commercial fish meals made from Peruvian anchovy were analyzed for proximate composition (Kjeldahl protein, ethyl ether fat, moisture, and ash), total fat, calcium, and phosphorus; 12 meals were analyzed for macro and micro minerals; and 19 meals for amino acids.</p> <p>Five tables are given: table 1 shows proximate composition and calcium and phosphorus content; table 2, mineral content; tables 3 and 4, amino-acid content; and table 5 presents a statistical summation of the data including averages, ranges, standard deviations, standard errors, and coefficients of variation. Also included in table 5 is the average value of each nutrient decreased by one-half standard deviation to establish a handbook value corrected for a safety factor. The data presented are useful to the fishery industry and feed manufacturers.</p> <p>*Items on back of card.</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p>	<p>ABSTRACTER: F. T. Piskur</p>
6.195	<p>EVALUATION OF MAIZE GLUTEN MEAL--PERUVIAN FISH MEAL MIXTURES AS PROTEIN SUPPLEMENTS FOR EGG PRODUCTION</p> <p>Jackson, N., and E. Svanace (Department of Agricultural Chemistry, Queen's University, Belfast BT9 6BB, and Ministry of Agriculture, Northern Ireland) <i>Journal of the Science of Food and Agriculture</i> <u>19</u>, No. 7, 389-392 (July 1968)</p> <p>Fish meal (Peruvian anchovy) (PFM) was used with maize gluten meal (MGM) in varying proportions to assess the optimum level of MGM that can be used in the ration of laying hens in which the two meals are complementary sources of amino acids. Light hybrid pullets were used and were housed in individual cages equipped with individual feed troughs and communal drinkers. During eight experimental periods individual records of egg weight, egg numbers, and feed intake were kept for each hen, including initial and final body weights. The pullets were randomly distributed into five treatment groups of 40 birds each. Each group was fed one of five experimental high-energy diets. The control diet, A, contained 14 percent fish meal as the main source of protein. The remaining diets contained the same basic ration except that the fish meal was progressively replaced with larger amounts of MGM as follows: Diet B, 25 percent PFM protein replaced by MGM (75 percent PFM); C, 50 percent PFM and 50 percent MGM; D, 25 percent PFM and 75 percent MGM; and E, 15 percent MGM and no fish meal. All diets were designed to contain about the same crude protein and similar metabolizable energy levels with only small differences in the cereal components.</p> <p>(over)</p> <p>*Item on back of card.</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p>	<p>ABSTRACTER: F. T. Piskur</p>

# NUTRITIVE CONTENT OF PERUVIAN ANCHOVY FISH MEAL

MEAL MIXTURES AS PROTEIN SUPPLEMENTS FOR LAYING HENS

maize oil and cod-liver oil. The fourth (control) group consisted of one lamb suckled by dam and two lambs fed skim milk containing saturated fat.

Four lambs fed milk containing cod-liver oil and not receiving  $\alpha$ -tocopherol acetate injections, developed acute muscular dystrophy; no abnormal changes occurred in peroxide hemolysis, packed cell volume, or hemoglobin concentration in the blood. Marked increases occurred in certain serum enzymes. Treatment of dystrophic lambs with 200 mg.  $\alpha$ -tocopherol produced rapid clinical recovery and an exponential decline in the raised activities of the serum enzymes.

Muscular dystrophy did not develop in the five lambs fed skim milk containing maize oil; small increases occurred in certain serum enzyme activities; and peroxide hemolysis greatly increased. Injections of 100 or 200 mg.  $\alpha$ -tocopherol acetate neither prevented nor cured the abnormally high levels of serum enzymes and peroxide hemolysis. Peroxide hemolysis was not reduced in the one lamb fed  $\alpha$ -tocopherol by mouth.

In the three lambs fed on skim milk containing both maize oil and cod-liver oil, peroxide hemolysis did not increase, but the two of them given much larger amounts of cod-liver oil than the third developed muscular dystrophy with elevated serum enzyme levels. The author postulates that hemolysis in lambs may not be a measure of vitamin E deficiency, but rather it, like encephalomalacia in chicks, depends on the fatty-acid composition of the unsaturated lipids in the diet. [3 tables, 5 figures, 25 references]

In general, the effectiveness of the ions in producing rancidity was in the following order:  $\text{Fe}^{++} > \text{V}^{++} > \text{Cu}^{++} > \text{Cd}^{++} > \text{Co}^{++} > \text{Zn}^{++}$ ;  $\text{Ni}^{++}$ ,  $\text{Ce}^{++}$ ,  $\text{Cr}^{++}$ , and  $\text{Mn}^{++}$ , in the concentrations used, had no effect.  $\text{Fe}^{++}$ ,  $\text{V}^{++}$ , and  $\text{Cu}^{++}$  were the most active catalysts. Nevertheless, there were important exceptions and, also, the comparative effectiveness of the metal ions was not the same for all species of fish tested.

The relative susceptibility of the muscle from the different species of fish was of the following order: fatty fish (herring and mackerel) > semifat fish (redfish and flounder) > scallops > lean fish (cod and haddock) > crustaceae (shrimp, crab). Changes occurring in the fish muscle during frozen storage made the muscle less susceptible to subsequent metal ion-induced rancidities. Oysters were less sensitive to  $\text{Cu}^{++}$  than were any of the muscle samples tested except those of scallop and lobster and were relatively insensitive to  $\text{Fe}^{++}$ .

Some experiments were carried out to determine whether added  $\alpha$ -tocopherol would retard metal-induced rancidity in cod muscle blends. It was found that the antioxidant was most effective against rancidity induced by  $\text{Fe}^{++}$  and  $\text{V}^{++}$ , and less effective against  $\text{Cu}^{++}$  and  $\text{Cd}^{++}$ .

There was a similarity to the odors that developed after the additions of  $\text{Fe}^{++}$ ,  $\text{V}^{++}$ , and  $\text{Cu}^{++}$  to the muscle of any one species of fish; however, they were not identical. Also, the species of fish used influenced the type of odors developed: those from lean fish (cod, haddock, and winter flounder) were quite similar and were very pronounced "rancid" odors; fatty fish developed into the oily-rancid stage more rapidly. The other odors accompanying rancidity in shucked oysters were difficult to identify and were unlike those of any other product. In the case of scallops, the early stage of rancidity was accompanied by intensification of the odors of fish. [6 tables, 1 figure, 6 references]

Mean percentage egg production for the PFM control (Diet A) was 80.2; it was about the same, 80.4 (difference was not statistically significant), for Diet B (75 percent PFM and 25 percent MGM); but there was a drop to 75.0 for Diet C (50 percent PFM and 50 percent MGM) and to 53.4 for Diet E where all the supplementary protein in the diet was provided by MGM. Mean egg weight dropped significantly when dietary MGM supplied 75 and 100 percent of the supplementary protein. Best food conversion efficiencies were obtained on the two diets with highest content of fish meal. The energetic efficiency for egg production, (Gross energy in eggs)  $\times$  (100)  $\div$  (Metabolizable energy of food) fell slightly when the contribution of dietary protein from the MGM was equal to that from PFM, and fell markedly at the two highest levels of dietary MGM.

The authors concluded that satisfactory egg production can be maintained when up to 25 percent of the protein of the fish meal control diet is replaced by maize gluten meal, and that the efficiency of utilization of energy for egg production is not adversely affected.

Castillo Morales, Gabriela  
Chemical Abstracts 69, No. 5, 18105x (July 29, 1968)

#### AMINO ACID COMPOSITION OF THE NONDIGESTIBLE RESIDUE OF FISH

6.195

51.9 FISH SOLUBLES. II - II - CHEMICAL PROPERTIES OF SQUID LIVER AS RAW MATERIAL OF SQUID LIVER SOLUBLES

Kitabayashi, Kunitsugu, Kunisuke Nakamura, Katsuo Shudo, and Senji Ishikawa  
Hokkaido-Ku Suidan Kenkyusho, Hokkaido, Japan

Chemical Abstracts 69, No. 23, 95259c (December 2, 1968)

IV - The quality and the chicken nutritional effect of fish solubles manufactured from various fresh Alaska pollack scraps. --Ibid. 105179c.

Chemical Abstracts 69, No. 25, 105178s (December 16, 1968)

Niwa, Katsutoshi, Toshio Tokunaga, and Nobuko Ogawa (Hokkaido Reg. Fish. Res. Lab., Yoichi, Japan)

FISH SOLUBLES. III - CHANGES OF NITROGEN COMPOUNDS AND VOLATILE COMPONENTS IN THE STICK WATER SEPARATED FROM SCRAP MEAL OF ALASKA POLLACK DURING STORAGE AT ROOM TEMPERATURE

AMINO ACID COMPOSITION OF FISH RESIDUES

CHEMICAL PROPERTIES OF SQUID LIVER SOLUBLES  
CHANGES IN STICK WATER FROM POLLACK MEAL DURING STORAGE  
FISH SOLUBLES FROM POLLACK SCRAPS OF VARYING FRESHNESS

<div data-bbox="75 1078 151 2156"> <div>6.197</div> <div>ACTIVATION ANALYSIS OF TRACE ELEMENTS IN FISHMEAL</div> </div> <div data-bbox="151 1078 725 2156"> <p>Lunde, G. (Central Institute for Industrial Research, Blindern, Oslo 3, Norway) Journal of the Science of Food and Agriculture <u>19</u>, No. 8, 432-434 (August 1968)</p> <p>Animals require small amounts (traces) of certain elements for proper nourishment and growth, among which are molybdenum, zinc, fluorine, copper, manganese, cobalt, chromium, selenium, and possibly arsenic. Relatively few data are available on trace elements in fish meal. The purpose of this study was to provide data on the trace element content of the most common types of fish meal commercially produced in Norway. The following elements were analyzed: mercury, bromine, arsenic, selenium, copper, cobalt, iron, zinc, molybdenum, and tungsten. Analysis was by the neutron activation method. Fish meals produced from herring (<i>Glupea harengus</i>), mackerel (<i>Scomber scomber</i>), capelin (<i>Mallotus villosus</i>), and Norway pout (<i>Gadus esmarki</i>) were analyzed. In addition, the distribution of the trace elements in the solid and liquid phases in boiled fish used as raw material for fish meal was analyzed. Data on commercial fishmeal samples are shown on back of card. There does not appear to be any significant difference in the trace element content of commercially produced fish meal produced from different species of fish.</p> <div>(over)</div> </div> <div data-bbox="725 1078 756 2156"> <div>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 15</div> <div>UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE</div> <div>ABSTRACTER: F. T. Piskur</div> </div>	<div data-bbox="75 0 151 1078"> <div>6.32</div> <div>TOXINS OF A BLUE-GREEN ALGA: SIMILARITY TO SAXITOXIN</div> </div> <div data-bbox="151 0 725 1078"> <p>Jackim, Eugene, and John Gentile (National Marine Water Quality Laboratory, West Kingston, Rhode Island 02892) Science <u>162</u>, No. 3856, 915-916 (November 22, 1968)</p> <p>The blue-green alga <i>Aphanizomenon flos-aquae</i> possesses a toxin with electrophysiological properties similar to those of the paralytic shellfish poison produced by <i>Gonyaulax catenella</i>. In purifying the active factor, the authors found three related toxic compounds similar to purified saxitoxin, the shellfish poison. The similarity of the two toxins motivated the authors to compare their chemical, chromatographic, and infrared absorption characteristics.</p> <p>The characteristics revealed by paper and thin-layer chromatography and the infrared spectra of the toxic fractions of the alga were similar, if not identical, to those of saxitoxin. Both toxins were found to be soluble in water, methanol, or, to a less extent, ethanol but insoluble in acetone, ether, or chloroform; stable in hot-acid solution of pH 2-4, but increasingly labile with increasing pH; dialyzable; resistant to crystallization; very hygroscopic; and stable for at least 2 hr. in homogenates of fish liver at pH 7.0. They both decompose without melting. Neither shows any visible or ultraviolet absorption above 210 n.m. Mice react identically to the two toxins, though the lethal dosage of the algal toxin is somewhat greater. Fish injected with low doses of either toxin recover rapidly.</p> <div>(over)</div> </div> <div data-bbox="725 0 756 1078"> <div>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 15</div> <div>UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE</div> <div>ABSTRACTER: L. Baldwin</div> </div>
<div data-bbox="75 1078 151 2156"> <div>6.197</div> <div>ACTIVATION ANALYSIS OF TRACE ELEMENTS IN FISHMEAL</div> </div> <div data-bbox="151 1078 725 2156"> <p>Lunde, G. (Central Institute for Industrial Research, Blindern, Oslo 3, Norway) Journal of the Science of Food and Agriculture <u>19</u>, No. 8, 432-434 (August 1968)</p> <p>Animals require small amounts (traces) of certain elements for proper nourishment and growth, among which are molybdenum, zinc, fluorine, copper, manganese, cobalt, chromium, selenium, and possibly arsenic. Relatively few data are available on trace elements in fish meal. The purpose of this study was to provide data on the trace element content of the most common types of fish meal commercially produced in Norway. The following elements were analyzed: mercury, bromine, arsenic, selenium, copper, cobalt, iron, zinc, molybdenum, and tungsten. Analysis was by the neutron activation method. Fish meals produced from herring (<i>Glupea harengus</i>), mackerel (<i>Scomber scomber</i>), capelin (<i>Mallotus villosus</i>), and Norway pout (<i>Gadus esmarki</i>) were analyzed. In addition, the distribution of the trace elements in the solid and liquid phases in boiled fish used as raw material for fish meal was analyzed. Data on commercial fishmeal samples are shown on back of card. There does not appear to be any significant difference in the trace element content of commercially produced fish meal produced from different species of fish.</p> <div>(over)</div> </div> <div data-bbox="725 1078 756 2156"> <div>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 15</div> <div>UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE</div> <div>ABSTRACTER: F. T. Piskur</div> </div>	<div data-bbox="75 0 151 1078"> <div>6.32</div> <div>TOXINS OF A BLUE-GREEN ALGA: SIMILARITY TO SAXITOXIN</div> </div> <div data-bbox="151 0 725 1078"> <p>Jackim, Eugene, and John Gentile (National Marine Water Quality Laboratory, West Kingston, Rhode Island 02892) Science <u>162</u>, No. 3856, 915-916 (November 22, 1968)</p> <p>The blue-green alga <i>Aphanizomenon flos-aquae</i> possesses a toxin with electrophysiological properties similar to those of the paralytic shellfish poison produced by <i>Gonyaulax catenella</i>. In purifying the active factor, the authors found three related toxic compounds similar to purified saxitoxin, the shellfish poison. The similarity of the two toxins motivated the authors to compare their chemical, chromatographic, and infrared absorption characteristics.</p> <p>The characteristics revealed by paper and thin-layer chromatography and the infrared spectra of the toxic fractions of the alga were similar, if not identical, to those of saxitoxin. Both toxins were found to be soluble in water, methanol, or, to a less extent, ethanol but insoluble in acetone, ether, or chloroform; stable in hot-acid solution of pH 2-4, but increasingly labile with increasing pH; dialyzable; resistant to crystallization; very hygroscopic; and stable for at least 2 hr. in homogenates of fish liver at pH 7.0. They both decompose without melting. Neither shows any visible or ultraviolet absorption above 210 n.m. Mice react identically to the two toxins, though the lethal dosage of the algal toxin is somewhat greater. Fish injected with low doses of either toxin recover rapidly.</p> <div>(over)</div> </div> <div data-bbox="725 0 756 1078"> <div>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 15</div> <div>UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE</div> <div>ABSTRACTER: L. Baldwin</div> </div>
<div data-bbox="75 1078 151 2156"> <div>2.05</div> <div>SALMONELLA -- MENACE OR MYTH?</div> </div> <div data-bbox="151 1078 725 2156"> <p>Thomas, R. Dean (Delist Chemical and Research Co., Fullerton, California) Feedstuffs <u>40</u>, No. 46, 74-75 (November 16, 1968)</p> <p>The author, a microbiologist who serves as a consultant and as president of a chemical and research company, postulates that the emotional response to the Salmonella problem has become much like past responses to polio and plague. As a result, he says, we have lost our perspective and have tended to put a great deal of emphasis on a situation that may not be a problem at all. In this article, he examines the supposed problem first from the view of Salmonella as a menace to public health and then as a problem in animal production.</p> <p>The author acknowledges that most rendering houses are heavily contaminated with Salmonella pathogens; yet, he asks, if the situation is so dangerous, why don't great numbers of the employees have serious problems with Salmonella infections? He also questions the importance of Salmonella as a national killer. In 1966, he notes, the number of people succumbing to Salmonellosis was estimated at 100; yet, in the latest U.S. Public Health report, just 1 year earlier, tuberculosis, which has been so controlled that it is now considered a "minor" disease, was reported to have caused 8,000 deaths; asthma, 4,520; bronchitis, 5,772; and enteritis, 7,899. Deaths from Salmonellosis were not even listed. Over 1.7 million people lost their lives to heart disease in 1965. Thus, the author reasons, the millions spent to eliminate Salmonella might be more usefully applied to other more serious disease problems.</p> <div>(over)</div> </div> <div data-bbox="725 1078 756 2156"> <div>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 15</div> <div>UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE</div> <div>ABSTRACTER: L. Baldwin</div> </div>	<div data-bbox="75 0 151 1078"> <div>6.37</div> <div>PROTEIN QUALITY OF VARIOUS ALGAL BIOMASSES PRODUCED BY A WATER RECLAMATION PILOT PLANT</div> </div> <div data-bbox="151 0 725 1078"> <p>Erchul, Beverly A. F., and Don L. Isenberg (North American Rockwell Corporation, El Segundo, California) Journal of Nutrition <u>95</u>, No. 3, 374-380 (July 1968)</p> <p>Because of the increasing shortage of protein sources and because of the development of water reclamation projects that have the potential for producing algal biomasses as a byproduct, interest in the protein quality of such biomasses is increasing. However, the economic feasibility of producing algae at a reclamation project depends on the value of the algae as feed.</p> <p>Earlier nutritional studies have shown that the protein quality of algae varies considerably. In 1961, Lubitz showed that <i>Chlorella</i> grown on a chemically defined medium had a protein efficiency ratio (PER) of 1.66 and a true digestibility of 86 percent. One year later, Cook reported a PER of 1.69 and a true digestibility of 65 percent for a 10:1 mixture of waste-grown <i>Scenedesmus</i> and <i>Chlorella</i>. In the same year, Leveille et al. reported that the PER of four species of algae grown under different conditions varied from 0.34 for <i>Spongococcum</i> to 1.38 for a <i>Scenedesmus-Chlorella</i> mixture.</p> <p>The present authors have determined the protein quality of seven algal biomasses harvested from a water reclamation pilot plant in California. They evaluated protein quality by determining PER (in grams weight gained per gram of crude</p> <div>(over)</div> </div> <div data-bbox="725 0 756 1078"> <div>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 15</div> <div>UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE</div> <div>ABSTRACTER: L. Baldwin</div> </div>

The author does not question that some animal species are particularly susceptible to certain strains of Salmonella or that Salmonella-free feeds would be of value to the very young of these species. However, he recognizes that Salmonella can hardly be eradicated, for the organisms are ubiquitous, and an environmental level of these bacteria will generally prevail. Only under laboratory, or carefully controlled environmental, conditions can they be eliminated. The most effective method of controlling animal-infecting Salmonella is through the use of drugs and a veterinarian. Such drugs as neomycin and furazolidone are especially effective.

One beneficial result from the Salmonella furor, says the author, is that rendering houses will have to clean up their facilities and provide more sanitary conditions for their employees to work in. Yet, the wholesale re-engineering of plants, as some people have suggested, seems certain to increase the cost of fish meal and other meat-rendered feed products. And we can ill afford unwarranted increases in the cost of animal feed ingredients. The time has come, the author concludes, to put the Salmonella problem into proper perspective.

(Cross Reference: 8.42)

Trace elements in commercial fish meals

Sample of fish species	Number	Parts per million of trace element										
		Se	As	Sb	Co	Cu	Zn	Fe	Hg	Mo	W	
Herring	1	6.2	6.4	620.0	15.0	3.0	88	--	81.0	50.0	50.0	30.0
	2	3.2	0.7	820.0	40.0	8.2	92	--	92.0	03.0	500.0	500.0
	3	4.3	0.5	070.0	52.0	0.2	48	--	93.0	30.0	500.0	500.0
	4	7.2	0.4	510.0	61.0	9.1	52	41	81.0	40.0	500.0	500.0
	5	2.2	0.2	620.0	51.0	3.2	58	901	60.0	31.0	410.0	410.0
	6	0.2	0.7	410.0	81.0	9.1	42	--	11.0	40.0	410.0	410.0
	7	9.3	0.5	210.0	43.0	4.2	59	--	31.0	91.0	500.0	500.0
Mackerel	1	3.5	8.3	510.0	11.0	2.1	88	--	12.0	50.0	500.0	500.0
	2	2.2	7.2	270.0	32.0	1.2	42	48	60.0	51.0	500.0	500.0
	3	3.1	9.2	510.0	50.0	1.7	801	--	620.0	2.0	500.0	500.0
Capelin	1	7.1	1.1	810.0	31.0	1.4	431	--	31.0	90.0	800.0	800.0
	2	1.1	6.3	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Norway pout	1	5.1	6.3	02.0	28.0	6.2	081	--	07.0	50.0	30.0	30.0

In the laboratory tests with fish boiled in some distilled water, it was found that zinc and molybdenum seem to occur in the resulting press cake, but copper and cobalt were more concentrated in the liquor.

protein consumed by test rats) and by using the modified nitrogen balance test described by Mitchell in 1924 and 1926. They also evaluated the effect on protein quality of moist heat applied to dried algae and of storage at room temperature for from 4 to 14 months.

The results show wide variations in both proximate composition and protein quality among the algal biomasses. Ash content varied from 17 to 43 percent, and crude protein from 27 to 50 percent; moisture content, however, was about 7 percent for all biomasses except one, which was about 5 percent. Calculated caloric values ranged from 1.70 to 2.28 kcal per gram. Casein-corrected PER values varied from 0.68 to 1.98, true protein digestibility from 51 to 75, and biological values from 60 to 76. (The authors suggest that some of the differences in protein quality may have been due to differences in protein digestibility rather than to differences in nitrogen retention.) The PER of *Chlorella* grown on a chemical medium decreased from 1.54 to 0.78 when the *Chlorella* was heated before being dried. However, moist heat applied after the algae were dried seemed to improve protein quality. Storing the algae in air at 7 percent moisture seemed to decrease the protein quality slightly; drying them in the sun had no effect on protein quality.

The authors conclude that algal biomasses can have a protein quality high enough to make the algae valuable as animal feed. They suggest that once a consistently high-quality product is produced, swine and poultry farmers may be able to replace with algal proteins those vegetable proteins that have to be shipped long distances. [20 references]

(Cross Reference: 2.9)

The authors conclude that the similarities of these toxins may indicate that they are identical or slightly modified products stemming from similar metabolic pathways.

(Abstract: L. Baldwin)

The effect on fatty-acid composition of age at the time of harvest, temperature, and continuous illumination during growth is mentioned. [12 references]

They found that fatty acids constituted 5 percent of the dry weight of the *G. cohnii*. Those fatty acids that were present in any amount greater than 1 percent of the total were 10:0 (2 percent), 12:0 (8 percent), 14:0 (19 percent), 16:0 (20 percent), 18:1 (14 percent), 22:6 (30 percent), and some unidentified acids with retention times greater than that of 22:6 (5 percent).

The authors have previously commented on the presence of 20:5 and 22:6 acids in dinoflagellates, an ecologically important component of phytoplankton, and on phytoplankton as sources of these acids, which are characteristic of the lipids of marine metazoans. Because they found 22:6 in *Gyrodinium cohnii* so unusual, they analyzed the fatty-acid composition of this dinoflagellate in detail.

Harrington, G. W., and G. G. Holz, Jr. (Department of Microbiology, State University of New York, Upstate Medical Center, Syracuse, 13210) *Biochimica et Biophysica Acta*, 164, No. 1, 137-139 (September 2, 1968)

# THE MONOENOIC AND DICOSEHEXAENOIC FATTY ACIDS OF A HETEROTROPHIC DINOFLLAGELLATE

6.54	LET'S RETURN TO THE BASICS OF MAKING FRANKFURTERS  Terrell, R. N. (Auburn University, Auburn, Alabama) National Provisioner 159, No. 25, 12-14 (December 21, 1968)  In this article, the author examined some concepts basic to production of quality frankfurters. Basically frankfurters are a fat suspended in a protein emulsion system; the protein coats the fat globules and holds moisture in. The stability of this emulsion depends on the amount and kind of protein that coats the fat and on the sequence in which salt, spices, curing agents, and other ingredients are added.  The two proteins of major concern to the sausage maker are myosin, which is the chief structural material in skeletal meats, and collagen, which is the chief structural material in organ and byproduct meats. Of the two, myosin forms the more stable emulsion, for collagen breaks down to a gelatin when it is heated. Therefore, the protein in frankfurters should be two-thirds myosin; collagen should constitute not more than one-third of the protein in frankfurters. In other words, the first major step in making sausages is the selection of meat ingredients according to the amount and kind of protein they contain.  The second major step involves the sequence in which other meats, salt, curing agents, water, spices, and other ingredients are added to the basic ones. Since both collagen and myosin are salt soluble, salt is added to the meat block (over)	7.89 (*)	VERY RAPID ACCUMULATION OF HYPOXANTHINE IN THE MUSCLE OF REDFISH STORED IN ICE  Fraser, Doris I., Sylvia G. Simpson, and W. J. Dyer (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia) Journal of the Fisheries Research Board of Canada 25, No. 4, 817-821 (April 1968)  In many species of fish, the level of hypoxanthine (Hx) increases after death from near zero at death to 3-5 umole/g or higher in spoiled material. The levels of Hx, which arises from the sequential degradation of 5'-inosine monophosphate (IMP) to inosine (Ino), to Hx, have been suggested as a monitor of autolytic and bacterial activity and thus a useful index of storage time and quality of certain species of fish. In preliminary experiments, the author observed unexpected rapid nucleotide degradation of redfish ( <i>Sebastes marinus</i> ) leading to maximum accumulation of Hx in about 4-5 days in ice (considerably before deterioration in eating quality became evident and long before the point of inedibility). To substantiate these findings, the authors tested two more lots of redfish and sampled them more frequently. They found that the autolytic enzymic dephosphorylation of IMP and the production of Hx were rapidly completed in redfish in just 4 days, before the point of inedibility was reached and before the outset of bacterial spoilage. Maximum production of Hx in certain other species of fish is reached only after the point of inedibility. Therefore, the content of Hx cannot be used as an index of freshness or of quality of redfish. These results show the wide variation in (over)	COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 3 PAGE 17 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE	ABSTRACTER: F. T. Piskur
7.51 (*)	THIN-LAYER GEL FILTRATION OF PROTEINS I - METHOD  Radola, Bertold J. (Institute of Radiation Technology, Federal Research Centre for Food Preservation, 75 Karlsruhe, Germany) Journal of Chromatography 38, No. 1, 61-77 (November 5, 1968)  The purpose of the study was to improve thin-layer gel filtration for the separation of protein. This method has not found as wide application for the determination of molecular weights of proteins on the microgram scale as have the column technique of gel filtration and other thin-layer chromatographic methods. This circumscribed use is due to its technical limitations--its results are less reproducible and its accuracy is lower than are those obtained by the column technique--and the lack of quantitative approach for evaluating the gel filtration pattern.  Several aspects of thin-layer gel filtration of proteins were examined--preparation of the plates, application of the sample, and detection of the results. Standard densitometric equipment was used for the evaluation of the results. Linear relations were established between the migration, referred to a standard protein (myoglobin), and molecular weight or Stokes radius of several well-defined globular proteins. Ferritin was separated into three fractions by gel filtration using Bio-Gel P-300; on disk electrophoresis, ferritin has been (over)	9.1	CONTROL OF EELGRASS USING 2,4-D IN OYSTER-GROWING AREAS  Thomas, M. L. H. (Fisheries Research Board of Canada Biological Sub-Station, Ellerslie, Prince Edward Island, Canada) Fisheries of Canada 21, No. 3, 13-16 (September 1968)  Eelgrass and Atlantic oysters grow together naturally in areas in the western Atlantic. However, if the bed is not cleaned off or the oysters are not fished with tongs for several years, the eelgrass can form an impenetrable mat, which makes fishing very difficult.  If the eelgrass were eradicated, the conditions of oyster beds would improve. The main improvement is thought to be the result of hardening of the bottom. The roots and stems of the eelgrass hold mud and silt and reduce the action of the current in carrying the sediment away. Thus the shells and shell fragments needed by young oysters for settlement are covered, the oysters' food supply is obstructed, and their shells become long and thin, reducing the market value of the adult oyster.  In this study, eight herbicides were tested for their ability to eliminate eelgrass. The one that could be used in economical amounts with most effect and without undesirable side results--such as killing other plants and animals or accumulating in the oysters to be passed on to consumers--was the butoxyethanol ester of 2,4-D[(2,4-dichlorophenoxy) acetic acid] embedded on small clay particles. These particles simply carry the chemical to the bottom, where it can take effect. (over)	COMMERCIAL FISHERIES ABSTRACTS VOL. 22 NO. 3 PAGE 17 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE	ABSTRACTER: L. Baldwin

9.1 (Cross Reference: 9.15)

The amount of 2,4-D necessary to eliminate eelgrass depends upon the plot size and the water action over the plot. Suggested application rates for 20 percent 2,4-D are in the following table.

Plot size Acres	Application rate	
	Moderate current lb/acre	Slight current lb/acre
0 to 1	800	100
1 to 5	400	200
5 to 20	200	100

The 2,4-D should be dispersed evenly on the water where it can sink to the bottom. The plot should be covered twice with swaths running at right angles. The best time for application is late June (though applications made between early June and late July have been successful) and at low slack tide (if the water is deep enough for the spreading equipment).

In the amounts shown above does not harm marine life; it is collected from the water and may be stored by the oyster for up to 2 months. Therefore, oysters should not be harvested for direct marketing from treated areas for 2 months after application.

68.7

7.522

# SEPARATION AND QUANTITATIVE DETERMINATION OF VOLATILE AMINES IN FISH AND SHELLFISH. I - COLOR DEVELOPMENT OF VOLATILE AMINES WITH NINHYDRIN

Hareida, Katsuhiko, Tadaaki Aman, Katsushi Kikuchi, and Kinjiro Yamada  
Chemical Abstracts 69, No. 7, 26100g (August 12, 1968)

Human and animal serum proteins were separated into three fractions on Sephadex G-200; the percentage of these fractions in human serum was estimated after sedimentation, and human serum glycoproteins were separated by periodic acid-Schiff staining. Soluble proteins were separated into six fractions. The proteins were detected in the soluble leaf proteins from spinach. The molecular weight of 50,000, 100,000, and 200,000 was found to be 50, 100, and 200,000 for 000, 000, and 200,000. The molecular weight of a substrate; the molecular weight of a substrate; the molecular weight of a substrate.

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Hareida, Katsuhiko, Tadaaki Aman, Katsushi Kikuchi, and Kinjiro Yamada  
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(Cross Reference: 9.15)

The authors devised a simple modification of the Aerograph Model A-700 Auto-prep for the collection of aerosols by electrostatic precipitation. Diagrams and details of the collection bottle, the collection table, and the bottle arrangement for collection are given. The authors used the electrostatic collector successfully with samples in which each fraction represented approximately 5 mg. of collected material per injection on a 1.6 x 150 cm. column, and the collection efficiency was quantitative. There was no evidence of degradation of the collected fractions.

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## IMPROVED PREPARATIVE COLLECTIONS FROM THE AUTOPREP GAS CHROMATOGRAPH

Fish, Duane, W. (Westminster College, Salt Lake City, Utah), and Donald G. Crosby (Agricultural Toxicology and Residue Research Laboratory, University of California, Davis)  
Journal of Chromatography 37, No. 2, 307-309 (October 8, 1968)

7.1 (Cross Reference: 7.5)

## MODIFIED METHOD FOR COLLECTING AEROSOLS

## APPLICATION OF FILTRATION METHOD TO DETERMINATION OF VOLATILE AMINES IN FISH

<p>9.13 (*)</p> <p>THE BLOOD LACTIC ACID LEVELS OF CARP IN THE DIFFERENT ENVIRONMENTS</p> <p>Namba, Kenji, and Teiji Kariya (Department of Fisheries, Faculty of Agriculture, Tohoku University, Sendai, Japan)</p> <p>Tohoku Journal of Agricultural Research 18, No. 4, 275-279 (December 1967)</p> <p>Acidosis in fish may be caused by either a respiratory or a metabolic factor. Many investigators, in showing the importance of lactic acid in relation to the acid-base balance, have assumed that the level of lactic acid in the blood is closely related to the condition of metabolism in the fish. The present authors have attempted to determine the influence of environment on the metabolism--and therefore on the levels of the blood lactic acid--of carp (<i>Cyprinus carpio</i>).</p> <p>Carp ranging in length from 92 to 155 mm, and in weight from 18 to 79.2 g, were used. In some experiments, the carp were suffocated in an airtight vinyl bag filled with 300 ml. of water or solution; in other experiments, the carp were allowed to stand in the 4-liter solution. Blood was drawn from the heart into a hypodermic syringe rinsed with 10 percent sodium citrate solution. The blood lactic acid level was determined according to the method of Barker and Summerson (1941).</p> <p>The author concluded that the decrease of blood corpuscle resistance and acidosis in the carp under the suffocative state probably can be caused by</p> <p style="text-align: right;">(over)</p> <p>Item on back of card.</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 19 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: F. T. Piskur</p>	<p>9.16 (*)</p> <p>CAGED CATFISH MAY SIGNAL FARM BREAKTHROUGH</p> <p>Anonymous</p> <p>National Fisherman 49, No. 9, 4C (December 1968)</p> <p>Channel catfish convert food to flesh better than almost any other animal commonly used for meat. Their conversion ratio averages about 1 lb. of flesh for 1.25 lb. of feed. In contrast, for 1 lb. of flesh, chickens reared in broiler houses must eat about 2.3 lb. of feed, swine must eat about 2.4 lb. of feed, and cattle must eat about 8 lb. Researchers at Southern Illinois University (SIU) think it very likely that the method they have devised for rearing catfish in cages can be refined to yield a ratio of 1 lb. of fish for 1 lb. of food.</p> <p>The virtually trouble-free system involves a wire-mesh cage (about 6 ft. deep by 20 ft. long), any natural or artificial body of water (the SIU experiments are being conducted in a strip mine pit), and a supply of artificial fish food (although the formula being used costs 11 cents a pound, an 8-cent formula will work). Holding densities of up to 200 lb. of fish per cubic yard of water have been achieved. In one experiment, the SIU team, on June 30, stocked a cage with 1,264 fish weighing slightly more than 0.5 lb. each. On August 15, when the fish were harvested, their average weight was 1.26 lb.</p> <p>The researchers believe this simple, inexpensive method of rearing a highly marketable food fish (prices range from 30 cents to 40 cents a pound for live fish)</p> <p style="text-align: right;">(over)</p> <p>Item on back of card.</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 19 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: L. Baldwin</p>
<p>9.14 (*)</p> <p>NUTRITIONAL REQUIREMENTS FOR CHANNEL CATFISH FINGERLINGS</p> <p>Deyoe, C. W., and O. W. Tiemeier (Kansas State University, Manhattan, Kansas)</p> <p>Feedstuffs 40, No. 45, 48, 50-51 (November 9, 1968)</p> <p>The article reviews research conducted during the past 15 years or more on the nutritional requirements of channel catfish fingerlings. The authors conclude the report with a summary of studies carried out at Kansas State University on the nutritive requirements of channel catfish fingerlings and the effects of various supplemental feeding programs on fish production. The results suggest certain feeding standards can be used as guides. The formulations and restrictions used in the studies included varying protein levels, energy levels, and additional vitamins and amino acids. Best results were obtained with diets formulated to 25 percent crude protein from plant and animal sources with minimum amino-acid levels of 0.52 percent methionine; 0.85 percent methionine + cysteine; 1.33 percent lysine; 1.48 percent arginine; 0.3 percent tryptophan; 0.5 percent threonine; and 0.5 percent valine. Energy level of 850 kcal. per pound of feed produced good results; energy levels below this amount did not perform as well, and higher energy levels did not improve performance. Restrictions for calcium from 1.4 to 1.5 percent and for phosphorus from 0.9 to 1 percent were used consistently. Diets having fat content above 4 percent produced well; restricting fat to 3.5 and 4 percent did not affect formulations in most circumstances. Restrictions for distillers dried solubles products, alfalfa products, fish meal, meat scraps, and blood meal have been established on the basis of</p> <p style="text-align: right;">(over)</p> <p>Item on back of card.</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 19 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: F. T. Piskur</p>	<p>9.14 (*)</p> <p>STANDARDS FOR SMELLS</p> <p>Harper, R., E. C. Bate Smith, and D. G. Land</p> <p>Odour Description and Odour Classification, 191 pp. (J. A. Churchill) 38s</p> <p>Reviewed by Cyril Burt (University College, London, England)</p> <p>New Scientist 40, No. 617, 42 (October 3, 1968)</p> <p>The book reviewed here is the joint work of a psychologist, a botanist, and a chemist. They have been investigating the problem of smell, particularly the part that odor plays in determining the flavor of foods. Their immediate aim was to develop a standardized nomenclature for odors similar to the Munsell system for describing colors.</p> <p>In the first half of the book, earlier classification systems are surveyed and present ones reviewed. The first systematic classification, that of Linnaeus in 1752, distinguished seven basic kinds of odor, which were characterized in terms of contemporary flora and materia medica. This terminology is still widely used. Recent work has shown that the most important determinants of odor are not the mere presence of given chemical elements nor even the general nature of the chemical compound (such as acid, alkali, or salt). Rather, they are the size, shape, and structure of the molecules and the presence of certain functional groups (such as a benzene ring in "aromatic" substances).</p> <p>In the second half of the book, the authors discuss the fundamental principles of classification and the special advantages of the factorial techniques</p> <p style="text-align: right;">(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 19 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: L. Baldwin</p>

9.6 (Cross Reference: 9.1)

A STUDY IN POPULATION DYNAMICS

Cushing, D. H.  
A Study in Population Dynamics, 200 pp. (University of Wisconsin Press, Madison 1968) Price \$7.50  
Reviewed by Richard C. Hemmuth (Bureau of Commercial Fisheries, Woods Hole, Massachusetts)  
Science 162, No. 3851, 346 (October 18, 1968)

This book describes past attempts at (1) definition and quantification of the more essential processes involved in the complex interactions between living organisms and their aquatic environment and (2) application of the information to the management of commercially exploitable marine fish stocks.

[Abstracter: L. Baldwin]

91.6

9.11

TWO METHODS OF DESCRIBING THE "AVERAGE" VERTICAL TEMPERATURE DISTRIBUTION OF A LAKE

Sweers, H. E. (Department of Energy, Mines and Resources, Ottawa, Ontario, Canada) Journal of the Fisheries Research Board of Canada 25, No. 9, 1911-1922 (September 1968)

Two techniques for obtaining "average" vertical temperature distribution of a stratified fresh-water lake are described. computation of the average temperature at different levels and computation of the average depth of a number of isotherms.

[Abstracter: F. T. Plekur]

91.6

9.6 (Cross Reference: 7.1)

PROGRESS IN GAS CHROMATOGRAPHY

Purnell, J. H. (Editor)  
Progress in Gas Chromatography, 392 pp. (Interscience (Wiley), New York [1968]) Price \$14.95  
Reviewed by Robert L. Pecsok (Department of Chemistry, University of California, Los Angeles)  
Science 162, No. 3853, 557-558 (November 1, 1968)

This sixth volume in a series entitled Advances in Analytical Chemistry and Instrumentation critically describes most of the important advances made in gas chromatography since 1962.

[Abstracter: L. Baldwin]

(Cross Reference: 6.19)

good performance. Diets without distillers dried solubles or alfalfa meal have not been formulated; these ingredients supply potential growth factors, various vitamins, and trace minerals. Consistent performances were obtained with the basic diet containing percent animal products in the formulations.

(Cross Reference: 7.80)

introduced by statistical psychologists. They recommend the original British method, which gives a hierarchical system of progressively smaller groups and subgroups. American investigators commonly use chemical reagents as olfactory stimuli, interpreting the classification obtained by statistical analysis in terms of chemical composition. British investigators commonly use naturally occurring substances, supplementing them with purer chemical ingredients only to obtain more stable points of reference. The factors thus obtained suggest a biological rather than a chemical classification.

I. Pleasant and salubrious stimuli	
A. Mainly vegetable	B. Mainly animal
1. Flowery	3. Meaty
2. Aromatic (spicy, nutty, or fragrant)	4. Cutaneous (as in sweat, milk, hair, or fur)
II. Unpleasant and insalubrious stimuli	
A. Mainly vegetable	B. Mainly animal
5. Rancid	7. Fishy
6. Scorched or burnt	8. Excremental

The commoner olfactory stimuli could be assigned a place on one of the six faces.

0.116 (Cross Reference: 4.11)

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SANDWICHED CAPILLARY COLUMNS FOR GAS CHROMATOGRAPHY

Liberti, Arnaldo, Giorgio Nota, and Giancarlo Coretti (Istituto di Chimica Analitica, Università di Roma e Napoli, Italy)  
Journal of Chromatography 38, No. 2, 282-286 (November 19, 1968)

The report deals with the evaluation of a new type of gas chromatographic column--the "sandwiched capillary column." In the sandwiched column, the fractionating medium is a thread inside a glass capillary. The present study used sandwiched columns of carbon yarns. Examples of separations are described. Two figures of chromatograms show separation of a mixture of geometric isomers (m-xylene/p-xylene/o-xylene and o-cresol/p-cresol) and the separation of isotopic pairs of hydrocarbons and their deuterated homologues (ethane/deuteroethane and cyclohexane/deuterocyclohexane). The results were reproducible when columns of the same geometric properties were used. [Abstract: F. T. Piskur]

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'Moscow 'Yunsoo 'Mosk) w0/93E '6 'No '69 'stacsas Isotm Chemical

VOLATILE BIOLOGICALLY ACTIVE HYDROCARBONS AS A FACTOR CAUSING THE OLEIC ACID

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 21

UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

2.05 CLOSTRIDIUM BOTULINUM TYPE F:  
(\*) ISOLATION FROM CRABS

Williams-Walls, N. J. (Engineering Experiment Station, Georgia Institute of Technology, Atlanta 30332)  
Science 162, No. 3851, 375-376 (October 18, 1968)

Two proteolytic strains of Clostridium botulinum Type F were isolated from the gills and viscera of two crabs (*Callinectes sapidus*) taken at the mouth of the York River (Virginia). This is the first time that proteolytic strains of C. botulinum Type F have been isolated in the United States and the first demonstration of its presence on the eastern coast of the United States. Two isolations of nonproteolytic strains of this immunologic type were made from natural sources along the west coast of the United States--once from Pacific Ocean sediments and once from the gills and viscera of a sockeye salmon. [9 references]  
[Abstract: F. T. Piskur]

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 21

UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

LABORATORY AND PLANT APPARATUS AND EQUIPMENT  
CHEMISTRY AND BIOCHEMISTRY  
PATHOGENS

2.1121

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Anonymous  
Fishing News International 7, No. 9, 13 (September 1968)

A new invention to take the place of otterboards in V-shaped trawling nets has been patented in Hong Kong. The invention, known as the stabilized diverting depressor, but nicknamed the "little torpedo" or the "guided missile" because of its shape, may have wider applications than just for fishing.

The stabilizer has a buoyant body and large stabilizing fins extending horizontally from the rear of its torpedolike body. It has a steel case pressurized by iron bulkheads and longitudinal stiffeners. The case, or body, is filled with expanded, rigid polyurethane foam that is injected through the nose cone.

Two iron balls suspended beneath the body are set in brackets connected by an iron bar. These balls revolve on water-lubricated axles and are the only part of the equipment to touch the sea floor. Thus friction is reduced, since the balls revolve unrestrictedly, and entanglements along the sea bed are simply rolled over. For this reason, the power required for trawling is as much as 25 percent less than that required with the otterboard. The buoyancy of the stabilizer and the weight of the iron balls allow the trawling speed to be varied without danger of the net's collapsing or becoming entangled. By using speed and length of the towing lines to advantage, the stabilizer may be used for mid-water trawling also.

[Abstract: S. G. Cordell]

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 21

UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

2.12 (Cross References: 1.85, 9.11)  
(\*)

A PROBABILITY SEA SURVEY PLAN FOR ESTIMATING  
RELATIVE ABUNDANCE OF OCEAN SHRIMP

Abramson, Norman J. (Marine Resources Operations, California Department of Fish and Game)  
California Fish and Game 54, No. 4, 257-269 (October 1968)

A stratified two-stage research vessel survey plan was designed to estimate the relative abundance of ocean shrimp in the Klamath River-Redding Rock bed off the northern coast of California. The first stage consisted of other trawl hauls at randomly selected points; the second stage, a random subsample of the catch from each haul. Formulas were developed for unbiased estimators of relative abundance and for associated variances. Several allocations of sampling effort were discussed and were applied to data from a fall 1965 survey. Proportional allocation at the first stage along with a constant sample size at the second stage were recommended for use because this combination was operationally the most feasible.

[Abstract: F. T. Piskur]

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 21

UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

FISHING GEAR  
EXPLORATORY FISHING

## CIGUATERA AND ICHT[H][H]YOSARCOTOXISM

Morelon, R., and P. Niauxat

Cahiers du Pacifique No. 10, 7-11 May 1967 (In French)

World Fisheries Abstracts 19, No. 3, 25-26 (July-September 1968)

The report contains a table listing some species of fish that are considered a cause of ciguatera and the places--mainly islands--where such problems have been noted.

[Extracted from WFA]

Lane, Charles E. (Univ. of Miami, Miami, Florida)  
Chemical Abstracts 69, No. 1, 1453m (July 1, 1968)

## 2.9 TOXINS OF MARINE ORIGIN

Kosaki, Thomas I., Hamilton H. Anderson (Univ. of Hawaii, Honolulu, Hawaii)  
Chemical Abstracts 69, No. 17, 65849c (October 21, 1968)

2.9 MARINE TOXINS FROM THE PACIFIC.  
IV - PHARMACOLOGY OF CIGUATOXIN(S)

RETENTION OF MEAT COLOR BY FROZEN TUNA.  
IV - ACCELERATION OF DISCOLORATION OF TUNA MEAT  
BY FREEZING AND ITS RELATION TO STORAGE TEMPERATURE

(8961 '91 Tokai Reg. Res. Lab. Tokyo, Japan)  
(1961 '91 Tokai Reg. Res. Lab. Tokyo, Japan)  
Chemical Abstracts 69, No. 1, 1871w (July 1, 1968)

## 3.2493

THE RELATION BETWEEN THE FRESHNESS  
AND THE AMOUNT OF HYDROGEN SULFIDE IN FISH

Takama, Kozo, Koichi Zama, Hisaao Igarashi (Hokkaido Univ., Hakodate, Japan)  
Chemical Abstracts 69, No. 19, 75673e (November 4, 1968)

CHANGES IN THE FLESH LIPIDS OF FISH DURING FROZEN STORAGE.

I - FLESH LIPIDS OF BLUEFIN TUNA, *THUNNUS THYNNUS*

## 2.118 (Cross Reference: 1.0145)

## SOVIET EXPERIENCE IN THE OPERATION OF FACTORY TRAWLERS

Anonymous

Fishing News International 7, No. 12, 24-26, 28, 31-32 (December 1968)

The report was prepared from a translation of a paper presented by E. V. Kamensky, State Designing Institute for Fishing Vessels, U.S.S.R., at the Technical Symposium held in conjunction with Inryprom-68, Leningrad. It covers the classification, design characteristics, hull structure, fishing gear, processing equipment, propulsion plants, navigation provisions, and medical facilities of Soviet factory trawlers. [Illustrated] [Abstracter: F. T. Piskur]

## 2.114 (Cross Reference: 2.15)

## GUTTING MACHINE WELCOMED

Anonymous

World Fishing 17, No. 9, 61 (September 1968)

A gutting machine that is cheap and compact has been invented by a Shetland farmer. The machine can gut cod, haddock, and whiting without doing any damage to the flesh. It operates simply, yet can gut round fish from 10 to 17 in. long at the rate of 30 to 45 a minute. Making a neat incision, it removes the gut, then washes and brushes the cavity.

Because of the labor shortage, the machine may be a great boon, for gutting with it is twice as fast as hand gutting. It is suitable for all types of boats from seine netters to freezer trawlers. It costs £890, but may cost more for ships having to install a hydraulic power source. [Abstracter: S. G. Cordell]

3.9 (Cross Reference: 6.54)  
(\*)

FISH FERMENTATION

Burkholder, L., P. R. Burkholder, A. Chu, N. Kostyk, and O. A. Roels (Marine Biology Division, Lamont Geological Observatory of Columbia University, Palisades, New York 10964)  
Food Technology 22, No. 10, 76-82 (October 1968)

The purpose of the research was to obtain basic information on microbial fermentation of fish material that would lead to the development of highly acceptable, low cost, high-protein foods or food supplements of considerable nutritive value and long shelf life. Menhaden were fermented with a variety of bacteria, yeasts, and molds obtained from different sources. The authors found that the fungus, *Geotrichum* sp. and the yeast *Candida lipolytica* showed promise for pure culture fermentation of fish material to produce human foods. The *Penicillium* mold may eventually be used if appropriate fermentation conditions can be developed. The selection of potentially useful organisms was made on the basis of organoleptic quality of the fermented products, the reduction in fat content, and the retention of protein in the mixtures undergoing fermentation.  
[6 tables, 2 figures, 29 references]  
[Abstract: F. T. Piskur]

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 23  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

4.11  
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GAS CHROMATOGRAPHY OF ISOMERIC FATTY ACID METHYL ESTERS

Allen, G. R., and M. J. Saxby (Carreras Ltd., Research Division, Nevendon Road, Basildon, Essex, England)  
Journal of Chromatography 37, No. 2, 312-314 (October 8, 1968)

The purpose of this study was to show that methyl esters of certain fatty acids saturated monocarboxylic acids containing 7-9 carbon atoms and isomers of 7-9 carbon atoms can be separated on capillary columns and that the methyl esters can be tentatively identified, after suitable choice of stationary phase, on the basis of retention time. Retention data are presented on methyl esters of fatty acids using four different stationary phases. Retention times were presented as retention times relative to methyl *n*-octate.  
[1 table, 9 references]  
[Abstract: F. T. Piskur]

\*Items on back of card.

The author describes a procedure for the photodensitometric quantification of thin-layer chromatograms that gives a complete analysis of a mixture of neutral lipids in a single chromatogram without the need for reference mixtures.  
[3 tables, 3 figures, 10 references]  
[Abstract: F. T. Piskur]

Downing, Donald T. (Department of Dermatology and Biochemistry, Boston University School of Medicine, Boston, Massachusetts)  
Journal of Chromatography 38, No. 1, 91-99 (November 5, 1968)

PHOTODENSITOMETRY IN THE THIN-LAYER CHROMATOGRAPHIC ANALYSIS OF NEUTRAL LIPIDS

COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 23  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

5.2 (Cross Reference: 2.8)  
(\*)

THERMAL AND 2450 MHz MICROWAVE ENERGY EFFECT ON THE DESTRUCTION OF THIAMINE

Goidblith, Samuel A., Steven R. Tannenbaum, and Daniel I. C. Wang (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139)  
Food Technology 22, No. 10, 64-66 (October 1968)

The purpose of the study was to determine whether microwave (that is, the electronic energy for preparation of food for processing and for cooking and baking) affect the destruction of thiamine (vitamin B<sub>1</sub>) other than by heat alone. The authors found that the degree of destruction of thiamine by microwave energy at 102.8° C. was due solely to temperature, and that microwave energy per se had no effect on the destruction of thiamine. [1 table, 4 figures, 6 references]  
[Abstract: F. T. Piskur]

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 23  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

6.32  
(\*)

STEROLS: ISOLATION FROM A BLUE-GREEN ALGA

De Souza, Noel J., and William R. Nes (Department of Biological Sciences, Drexel Institute of Technology, Philadelphia, Pennsylvania 19104)  
Science 162, No. 3851, 363 (October 18, 1968)

From the filamentous blue-green alga *Phormidium luridum* (var. *olivaceae* Borech), the authors isolated a crystalline mixture of sterols that consisted of unsaturated 24-ethylcholesterols having  $\Delta^7$ ,  $\Delta^7$ , 7, and  $\Delta^5$  bonds; their derivatives; and a small amount of cholesterol. The two major components (>80 per cent) were 24-ethyl- $\Delta^7$ -cholesterol and 24-ethyl- $\Delta^7$ , 22-cholestadienol. Phytol was isolated and identified, and a trace of squalene was noted. [18 references]  
[Abstract: L. Baldwin]

\*Items on back of card.

Ratsep, E.  
Chemical Abstracts 69, No. 13, 51062d (September 23, 1968)

CHEMICAL COMPOSITION AND FOOD VALUE OF FISH WASTE PRODUCTS

COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 23  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

#### 4.11 DENSITOMETRIC MICROQUANTITATION OF LIPID CLASSES SEPARATED BY THIN LAYER CHROMATOGRAPHY

Biezenski, J. J., W. Pomerance, and J. Goodman (Department of Obstetrics and Gynecology, Maimonides Medical Center, and State University of New York, Downstate Medical Center, Brooklyn, New York)  
Journal of Chromatography **38**, No. 1, 148-151 (November 5, 1968)

By modification of the technique described by Blank et al. (1964) for application of densitometry to quantification of lipids separated by thin-layer chromatography (TLC) and of the two-step TLC technique by Freeman and West (1966), the present authors were able to quantitate microquantities of lipids of amniotic fluid. [1 table, 3 figures, 10 references] [Abstract: F. T. Piskur]

Holloway, P. J. (Sch. Pharm., Univ. London, London, England)  
Chemical Abstracts **69**, No. 24, 97862t (December 9, 1968)

#### 4.11 CHROMATOGRAPHIC ANALYSIS OF SPERMACEI

Idler, D. R., and P. Wiseman (Fish. Res. Bd. of Canada, Halifax, Nova Scotia)  
Chemical Abstracts **69**, No. 23, 94013f (December 2, 1968)

#### 4.19 DESMOSTEROL AND OTHER STEROIDS OF THE ALASKAN KING CRAB AND THE NORTH ATLANTIC QUEEN CRAB

Williams, J. P. (Department of Botany, University of Toronto, Toronto 5, Ontario, Canada)  
Journal of Chromatography **36**, No. 4, 504-511 (September 10, 1968)

The relative importance of plastoquinones and tocopherylquinones in photosynthetic electron transport is being investigated in the author's laboratory and in others. In evaluating the function of these lipids in the chloroplasts and photosynthesis, it is essential that accurate estimates of quantities present are known and that accurate and reliable methods to determine these are available.

The methods used in separating and purifying the quinones and  $\alpha$ -tocopherol are paper, thin-layer, and column chromatography. Absorbents used in column chromatography often cause breakdown of the quinones; thin-layer chromatography often results in streaking and poor resolution. The present researchers devised a new method which used a short column for the separation of three plastoquinones, vitamin K<sub>1</sub>,  $\alpha$ -tocopherylquinone,  $\alpha$ -tocopherol, and coenzyme Q<sub>10</sub> found in broad bean leaves. The method is suitable for rapid quantitative determination of these quinones and  $\alpha$ -tocopherol and may be adapted to large scale separation of these lipids.

The determinations suggest that plastoquinone is the most abundant in leaves of the broad bean and that other plastoquinones occur in considerably lower quantities particularly in the young leaves. It was also shown that  $\alpha$ -tocopherol occurs in broad bean leaves in similar concentration to plastoquinone A, but the tocopherylquinones occur in much lower concentrations. [Abstract: F. T. Piskur]

#### ORGANIC ANALYSIS

#### ORGANIC ANALYSIS

#### CHEMICAL AND PHYSICAL PROPERTIES OF OILS

#### 6.36 SEAWEED IN AGRICULTURE AND HORTICULTURE

Stephenson, W. A.  
Seaweed in agriculture and horticulture, 231 pp. (n.d.) (Faber and Faber, 24 Russell Square, London, W.C.1, England) 45s  
Reviewed by S. Laverton  
New Scientist **39**, No. 615, 621 (September 19, 1968)

The author of this book manufactures and markets a liquid fertilizer made by alkaline hydrolysis of seaweed. The fertilizer, which is sold in either liquid or dehydrated form, is distributed world wide. The book gives reasons why seaweed fertilizer is effective, recommends ways of using it on a wide range of crops and plants, and describes various nonagricultural uses of seaweed.

[Abstract: L. Baldwin]

Altmann, H., F. Fetter, E. Pfisterer, A. Von Szilvinyi, and K. Kalndl (Inst. Biol. Landwirt., Reaktorzentrum Selbersdorf, Selbersdorf, Austria)  
Chemical Abstracts **69**, No. 9, 33375d (August 26, 1968)

#### 6.39 RADIATION EFFECT ON DNA SYNTHESIS IN SYNCHRONOUS CHLORELLA CELLS

#### 6.54 PURIFICATION AND CONCENTRATION OF FISH PROTEIN

British Patent 1,108,188  
Chemical Abstracts **69**, No. 11, 42906e (September 9, 1968)

6.54 (Cross Reference: 3.335)

#### HYDROGEN PEROXIDE IN COMMERCIAL FOODS

Kawasaki, Chikataro, Masaomi Kondo, Hideo Nagano, and Tomio Nagayama (Osaka Univ., Osaka, Japan)  
Chemical Abstracts **69**, No. 17, 69216f (October 21, 1968)

7.525 (Cross Reference: 6.54)

#### QUANTITATIVE DETERMINATION OF TRYPTOPHAN IN ANCHOVETA FLOUR. SPECTROPHOTOMETRIC METHOD

Valles, Luis F., F. J. Rivas Ramos, and P. C. Rodriguez (Lima, Peru)  
Chemical Abstracts **69**, No. 17, 66182s (October 21, 1968)

#### MARINE PLANT PRODUCTS

#### FISH PROTEIN CONCENTRATE

#### MISCELLANEOUS BYPRODUCTS

#### ORGANIC ANALYSIS

6.54 (Cross Reference: 4.19)

(\*)  
NATURE OF RESIDUAL LIPIDS  
IN MENHADEN FISH PROTEIN CONCENTRATE

Medwadowski, B., J. Van Der Veen, and H. S. Olcott (Institute of Marine Resources, Department of Nutritional Sciences, University of California, Berkeley 94720) Journal of the American Oil Chemists' Society 45, No. 10, 709-710 (October 1968)

Because most of the fish available for production of fish protein concentrate (FPC) have a high fat content, the authors analyzed the residual lipids in an FPC prepared from menhaden (*Brevoortia tyrannus*), a fatty fish used for many years in the manufacture of fish meal. The results were compared with those obtained from a previous analysis of the residual lipids of FPC made from red hake (*Urophycis chuss*).

The menhaden FPC sample had about the same amount of residual lipid as did the hake FPC (0.15 percent as compared to 0.11 percent for the hake). The menhaden FPC lipid was almost entirely triglyceride, with small amounts of free fatty acids, mono- and diglycerides, and phospholipid (PL). Total PL amounted to 4 percent of the total lipid (hake FPC lipid contained 20 to 35 percent PL). The menhaden FPC lipid fatty acid methyl esters had approximately the same composition as did those from fresh menhaden oil; those from hake FPC lipids differed somewhat from those of the fresh hake. There was a lower content of highly unsaturated acids in the hake FPC product, which suggests that the difference may reflect some oxidative losses during handling.

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 25  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

7.51  
(\*)  
THE DETERMINATION OF THE MOLECULAR WEIGHT  
OF PROTEIN SUB-UNITS ON ACRYLAMIDE GELS

Peel, David (National Institute for Medical Research, Mill Hill, London, N.W. 7, England) Biochemical Journal 108, No. 5, 51P (August 1968)

Sodium dodecyl sulfate (SDS) and other anionic detergents dissociate proteins into subunits; SDS binds hydrophobically to the protein producing a complex with a high negative charge. Earlier studies of this interaction by electrophoresis in free solution showed that excess SDS runs as a front ahead of the complexes. The author found, in experiments separating such complexes by electrophoresis on acrylamide gels, that the mobilities of the proteins were inversely related to their molecular weight. Choice of mobility reference as the SDS front on the fastest moving protein, or variation in gel concentration, arbitrarily altered the linear relation between the mobility  $1/R_f$  (protein mobility was expressed as an  $R_f$  in relation to mobility of an SOS) and (molecular weight) $^{1/2}$ . The author concluded that with the use of a suitable choice of protein markers it should be possible to estimate the molecular weight of a protein-subunit quickly and with acceptable accuracy. The method should be of particular value for estimating the molecular weight of insoluble proteins from membranes.

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COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 25  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

FISH PROTEIN CONCENTRATE

ORGANIC ANALYSIS

8.59 (Cross Reference: 6.34)

(\*)  
ALGINATE LYASES IN THE HEPATOPANCREAS  
OF A MARINE MOLLUSC, *DOLABELLA AURICULA* SOLANDER

Misizawa, Kazutosi, Sonoko Fujibayashi, and Yoshiko Kashiwabara (Botanical Institute, Tokyo Kyoiku University, Bunkyo-ku, Tokyo, Japan) Journal of Biochemistry 64, No. 1, 25-37 (July 1968)

Recently interest has centered on "eliminase," a particular group of "lyases," which degrade various polyuronides to oligouronides containing a double bond in the residue at the nonreducing end. It is thought that these enzymes split the glycosidic linkages of uronide molecules by an elimination reaction and not be hydrolysis.

Alginic acid is an acid polysaccharide chiefly confined to cell-walls of brown algae and is composed of two kinds of uronic residues--D-mannuronic acid and L-guluronic acid. However, the chemical structure of this polysaccharide is still unknown. This report presents results of studies on the lyases from an acetone powder of the hepatopancreas of *Dolabella auricula* Solander, a marine mollusk. Purified enzyme preparations were made and their substrate specificities studied. Also, the purified products of the enzyme digests were examined for certain physical and chemical properties.

(Abstracter: F. T. Piskur)

(Items on back of card.)

COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 25  
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9.6 (Cross Reference: 0.34)

(\*)  
UREA AS A PROTEIN SUPPLEMENT

Briggs, Michael H. (Editor) Urea as a Protein Supplement, 466 pp. (Pergamon, New York [1967]) Price \$18 Reviewed by B. Connor Johnson (Department of Biochemistry, University of Oklahoma Medical Center, Oklahoma City) Science 162, No. 3856, 889 (November 22, 1968)

The 23 chapters of this book, which was written by authors from 11 countries, are divided into four sections: "History, Manufacture and Role of Urea in World Food Problems," "The Effect of Urea on Ruminant Physiology," "Urea as a Supplement for Ruminants," and "Urea in Diets for Non-Ruminants." The reviewer states that the book is of real value to people working in the field of ruminant nutrition, particularly to people in countries that are just developing an active animal agriculture and to those in areas where protein sources for ruminant feed are scarce or expensive.

(Items on back of card.)

(Abstracter: L. Baldwin)

Halstead, Bruce W. Chemical Abstracts 69, No. 23, 94105n (December 2, 1968)

POISONOUS AND VENOMOUS MARINE ANIMALS OF THE WORLD,  
VOL. 2: VERTEBRATES

COMMERCIAL FISHERIES ABSTRACTS VOL 22 NO 3 PAGE 25  
UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ORGANIC COMPOSITION

NUTRITIONAL VALUE OF BYPRODUCTS OTHER THAN MEAL  
ICHTHYOLOGY

<p>7.8 (Cross References: 7.4, 7.53)</p> <p>ANALYTICAL METHODS FOR FISH MEAL</p> <p>Anonymous Fishing News International <u>7</u>, No. 9, 30, 33-34, 36 (September 1968)</p> <p>The report describes in detail the analytical methods for determining crude protein, moisture, fat, ash, sand, and salt in fish meal. These methods were selected by the Scientific Committee of the International Association of Fish Meal Manufacturers; they are consistent with those proposed by the European Common Market Authorities; and they are "similar" to methods recommended by the Association of Official Agricultural Chemists of the United States (now the Association of Official Analytical Chemists). (Abstract: F. T. Piskur)</p> <hr/> <p>7.89</p> <p>THE FREE AMINO ACIDS AS CHEMICAL INDICES OF DECOMPOSITION IN FISH</p> <p>Wierzbowski, J., T. Fuks (Med. Acad., Gdansk, Poland) Chemical Abstracts <u>69</u>, No. 1, 1889h (July 1, 1968)</p> <hr/> <p>(Cross Reference: 0.37)</p> <p>RETENTION OF ISOPROPYL ALCOHOL IN FISH PROTEIN CONCENTRATE</p> <p>Ackman, R. G., and P. H. Odense (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia) Journal of the Fisheries Research Board of Canada <u>25</u>, No. 4, 908-908 (April 1968)</p> <p>The retention of isopropyl alcohol within particles of fish protein concentrate is ascribed to the "partially hydrated membrane effect." Menting and Hoogstraal, working with various organic membranes, concluded that there is operative a selective membrane, lattice, or sieve effect which permits passage of water molecules and volatile organic molecules above a limiting proportion of water to solids. Below the limiting level, the organic molecules will not pass through the membrane or lattice formed of solids and water. The present authors suggest that such an effect takes place in the retention of isopropyl alcohol in fish protein concentrate. (Abstract: F. T. Piskur)</p>	<p>9.3 (Cross Reference: 1.01111)</p> <p>CANADA CONTROLS PART-TIME SALMON FISHERMEN</p> <p>Anonymous Fishing News International <u>7</u>, No. 10, 20 (October 1968)</p> <p>Part-time fishermen will be eliminated with the new license regulations introduced by the Federal Fisheries Ministry of Canada. The rules are designed to increase the average income of the bona fide salmon fishermen of British Columbia, by reducing the size of the fleet and helping to conserve runs.</p> <p>No licenses will be issued to boats that neglected to report their catch in 1967 or up until September 6, 1968. Perhaps 1,000 boats will be eliminated by this new rule. Boats landing less than \$1,250 worth of salmon will be issued a Class B license. No upgrading will be allowed on Class B boats, and once the boat proves unseaworthy, both license and vessel will retire. The remaining 6,000 commercial fishermen will be sold Class A licenses, which will be, in effect, a part of the boat. If the fisherman wishes to build a new boat, he must transfer the license; if the boat is sold, the license goes with it; if the boat is sunk, the license goes to the bottom with the ship. A license will cost \$10 next year instead of \$5 as in previous years.</p> <p>The licensing bill is designed as a safeguard against other tradesmen (not fishermen) who fish for only 2 or 3 months out of the year and who are seriously reducing the catch per boat, with detrimental results for the year-round fisherman. (Abstract: S. G. Cordell)</p> <hr/> <p>8.56</p> <p>BIOCHEMISTRY OF SHELLFISH LIPIDS. VIII - OCCURRENCE OF CERAMIDE MONO- AND DIHEXOSIDE IN CORBICULA, CORBICULA SANDAI</p> <p>Hori, Taro, Osamu Itasaka, and Michiko Kamimura (Department of Chemistry, Faculty of Education, Shiga University, Otsu, Shiga, Japan) Journal of Biochemistry <u>64</u>, No. 2, 125-128 (August 1968)</p> <p>Glycolipids from the tissues of corbicula, <u>Corbicula sandai</u>, consist of several compounds belonging to sphingoglycolipids. In 1966, Itasaka reported on two of the ceramide oligosaccharides. In the present paper, the chemical composition of two ceramide monohexosides (glucosyl-ceramide, which constitutes 77 percent, and galactosyl-ceramide, which constitutes 23 percent) and a ceramide dihexoside is described. Ceramide dihexoside was different from any glycolipids of higher animals in its mannose content in place of galactose. Apparently a new type of ceramide dihexoside exists in shellfish glycolipids; tentative structure proposed was mannosylglucosyl-ceramide. (Abstract: L. Baldwin)</p>
<p>6.54</p> <p>ODORLESS AND TASTELESS FISH PROTEIN CONCENTRATE</p> <p>French Patent 1,502,113 Chemical Abstracts <u>69</u>, No. 25, 105236j (December 16, 1968)</p> <hr/> <p>8.51</p> <p>AMINO ACID COMPOSITION OF CANNED CASPIAN SPRAT</p> <p>Kushchalov, G. N., and S. I. Safonova (Astrakhan. Tekh. Inst. Ryb. Prom, Khodz., Astrakhan, U.S.S.R.) Chemical Abstracts <u>69</u>, No. 23, 95211f (December 2, 1968)</p>	<p>REGULATION AND INSPECTION</p> <p>ORGANIC COMPOSITION</p>



Subject	Page No.	Code No.	Subject	Page No.	Code No.
ANALYSIS, GENERAL			FROZEN FISH, CHANGES IN DURING COLD STORAGE		
Description and classification of odors	19	9.6	Drip in stored frozen plaice fillets	9	3.2499
			Changes in acid content of stored clams	10	3.2499
ANALYSIS, INORGANIC			Effect of additives on frozen stored pollock muscle	10	3.2499
Analytical methods for fish meal	26	7.8	Effect of frozen storage on color of tuna meat	22	3.2491
			Changes in H <sub>2</sub> S during storage of fish	22	3.2493
			Changes in tuna lipids during frozen storage	22	3.2493
ANALYSIS, ORGANIC			FROZEN FISH, CHANGES IN DURING FREEZING		
Fatty acid analysis of vitamin A esters	11	4.11	Effect of single and double freezing on cod quality	7	3.239A,B
Determination of fat content in herring	12	4.11	Protein extractability of aged cod muscle	7	3.249
Thin-layer gel filtration of proteins	17	7.51			
Application of thin-layer gel filtration method	18	7.51	FROZEN FISH, PROCESSING		
Modified method for collecting aerosols	18	7.1	Faster freeze drying through improved heat transfer	10	3.2349
Determination of volatile amines in fish	18	7.522			
Gas chromatography of isomeric fatty acid methyl esters	23	4.11	GEAR, FISHING		
Photodensitometry in thin-layer chromatograms	23	4.11	New trawl door	3	2.1121
Analysis of spermaceti	24	4.11	Power blocks for small boats	3	2.114
Densitometry quantification of lipids by TLC	24	4.11	An otterboard substitute	21	2.1121
Isolating quinones and $\alpha$ -tocopherol	24	4.11			
Spectrophotometric determination of tryptophan	24	7.525	ICHTHYOLOGY		
Determining molecular weight of protein subunits	25	7.51	Study in fish population dynamics	20	9.6
			Poisonous and venomous marine vertebrates	25	9.6
APPARATUS AND EQUIPMENT, LABORATORY AND PLANT					
Progress in gas chromatography	20	9.6	MARINE PLANT PRODUCTS		
Sandwiched capillary columns for gas chromatography	21	0.116	Characteristics of blue-green algal toxin	15	6.32
			Protein quality of reclaimed water-grown algae	15	6.37
AUTHOR INDEX			Fatty acid composition of <u>Gyrodinium</u> <u>cohnii</u>	16	6.32
BIOCHEMISTRY AND METABOLISM OF FISH			Sterols in blue-green alga	23	6.32
Lactic acid levels in carp blood	19	9.13	Seaweed in agriculture and horticulture	24	6.36
			Effect of radiation on <u>Chlorella</u> cells	24	6.39
BYPRODUCTS, MISCELLANEOUS			NUTRITIONAL VALUE OF FISHERY BYPRODUCTS OTHER THAN MEAL		
Basic principles of frankfurter manufacture	17	6.54	Effects of dietary lipids on lambs and therapeutic effect of vitamin E	13	4.90
Hydrogen peroxide in fish paste	24	6.54	Fish solubles from pollock scraps of varying freshness	14	6.15
			Composition and food value of fish scraps	23	6.55
CANNED FISH, CONTAINERS			Residual lipids in menhaden FPC	25	6.54
Sulfide staining in tin foodpacks	9	3.338	Urea as a protein supplement	25	9.6
			OCEANOGRAPHY		
CANNED FISH, PROCESSING			Reducing vertical temperature traces	20	9.11
Enhancing flavor of canned seafoods	9	3.336			
			OILS, CHEMICAL AND PHYSICAL PROPERTIES		
CHEMISTRY AND BIOCHEMISTRY, MISCELLANEOUS			Metal catalyzed lipid oxidation	11	4.21
Fluorescence spectroscopy of proteins	1	0.321	Selective ester hydrogenation	12	4.22
Antigenic reactivity of tyrosine residues of whale myoglobin	1	0.35	Sterols in king and queen crab	24	4.19
Subcellular distribution of O-seryl-N-acetylglactos-amine glycosidase	1	0.36			
Physical state of water in foods	2	0.3	OYSTERS		
Thyroxine degradation	2	0.3	Controlling eelgrass in oyster beds	17	9.1
Lysosomal esterase in liver and kidney	2	0.38			
Acceleration of oleic acid oxidation by algal fractions	21	0.3			

COMPOSITION, ORGANIC					
Fatty acids in cod flesh lipids	11	4.13			
Fatty acids in cod flesh lipids	11	4.15			
Squalene content of fish liver esters	12	4.15			
Changes in stick water from pollock meal during storage	14	6.15			
Chemical properties of squid liver solubles	14	6.15			
Alginase lyases in the hepatopancreas of a marine mollusk	25	8.59			
Amino-acid composition of canned Caspian sprat	26	8.51			
Glycolipids of shellfish	26	8.59			
DRIED AND DEHYDRATED FISH					
Convective heat transfer for freeze-drying foods	10	3.63			
EXPLORATORY FISHING					
Estimating relative abundance of shrimp	21	2.12			
FACTORYSHIPS					
Soviet factory trawlers	22	2.118			
FISH CULTURE					
Nutritional requirements of channel catfish	19	9.14			
Rearing channel catfish in cages	19	9.16			
FISH MEAL, NUTRITIVE VALUE					
Nutritive content of Peruvian anchovy fish meal	13	6.190			
Meal mixtures as protein supplements for laying hens	13	6.195			
Amino-acid composition of fishmeal residue	14	6.195			
Trace elements in fish meal	15	6.197			
FISH PROTEIN CONCENTRATE					
Purifying and concentrating fish protein (Br. Pat. 1,108,189)	24	6.54			
A method for making FPC (Fr. Pat. 1,502,113)	26	6.54			
Retention of isopropyl alcohol in FPC	26	6.54			
FISHING METHODS					
Attracting fish by pulsed low-frequency sound	3	2.146			
Efficiency of scallop dredges	3	2.1478			
Skin-diving for scallops	5	2.1479			
FRESHNESS OF FISH					
Hypo-anthine in iced redfish	17	7.89			
Measure of decomposition of fish	26	7.89			
PATHOGENS					
Overemphasis on the <u>Salmonella</u> problem	15				2.05
Proteolytic <u>Clostridium botulinum</u> in crab	21				2.05
PRESERVATIVES, IRRADIATION					
Irradiation of fisheries products	7				3.15
PRESERVATIVES AND SANITATION					
EDTA compounds for preserving haddock fillets	5				3.12
Penetration of sodium nitrite and sodium tripolyphosphate in haddock fillets	5				3.12
Uptake of sodium and phosphorus in cod muscle during dipping	5				3.12
PRESERVED FISH, MISCELLANEOUS					
Fish fermentation	23				3.9
PROCESSING EQUIPMENT					
Gutting machines	22				2.114
RANCIDITY					
Fish muscle rancidity	13				4.5
REGULATION AND INSPECTION					
Controls on Canadian salmon fishermen	26				9.3
SALT FISH					
Water diffusion in dry salted fish	9				3.5
SPOILAGE					
Dissolution of fish muscle homogenates by lysolecithin	1				0.38
Quality changes in albacore tuna during storage on ice and in RSW	4				2.00
TOXICITY					
Ciguatera and ichthyosarcotoxism	22				2.9
Pharmacology of ciguatoxins	22				2.9
Review of marine toxins	22				2.9
VITAMINS, B-COMPLEX					
Destruction of thiamine by microwave energy	23				5.2

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